

november  
1956

MACHINE AND TOOL

# blue book

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Bends in Sheet  
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**National Cash  
Register's Bahl,  
"... Training  
Program Pays Off."**

—Page 99



**hitchcock  
publication**



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# Never Confuse the No. 8 MARVEL with an ordinary Band Saw

...only the MARVEL is Universal



Only on a No. 8 MARVEL can the saw column be instantly indexed and locked at any angle from 45° right to 45° left, and the saw then fed thru the work at the desired angle — without moving the work.



Only a No. 8 MARVEL can do all of these things: Snip-off a 1/2" rod or cut-off an 18" x 18" cross section.



Rough to Size and Shape



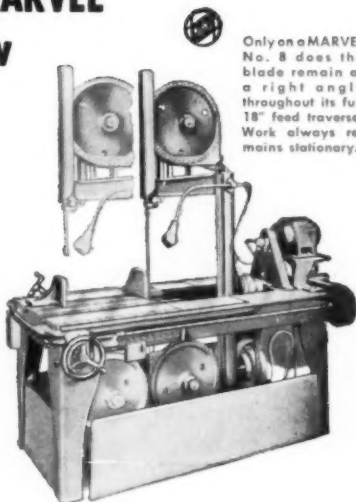
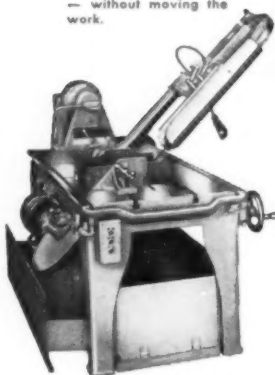
Miter



Index



cut off and shape  
Structural Beams



Only on a MARVEL No. 8 does the blade remain at a right angle throughout its full 18" feed traverse. Work always remains stationary.



Only a No. 8 MARVEL has the large T-slotted work table, with removable quick action vise, that permits accurate set-ups of work of unrestricted sizes and shapes, special fixtures; Etc.

## "Rough Machine" to size and shape with minimum chip waste

The No. 8 MARVEL is the "busiest tool in the shop" wherever installed because it is a *universal* tool—has both the capacity and the versatility to handle not only standard sawing jobs but innumerable "trick" and convenience jobs as well. More than a metal saw, the No. 8 MARVEL is a fine machine tool with machine tool features like: Both power and hand feeds; Depth Stops; Automatic Blade Tension; Built-in Coolant Pump; Three operating speeds (or six with 2-speed motor). Moisture-proof electrical controls that conform to both "J.I.C." and "MACHINE TOOL" electrical standards; Dirt-proof ball bearings, etc.

If you cut, machine or fabricate metal, this is a sawing machine you should know about. Write for catalog.







## SUNNEN HONING ENGINEERS SOLVE HOLE PROBLEMS ON THE SPOT

Sunnen field representatives are far more than salesmen. They are factory trained engineers who have specialized knowledge of everything connected with producing accurate holes.

They carry a demonstrator honing machine . . . and can work out most any hole problem you may have. In addition, Sunnen Laboratory service is available to help handle unusually complex jobs.

See for yourself how Sunnen Honing can cut your hole production costs, and eliminate production bottlenecks—right in your plant.

**TODAY'S TOLERANCES AND FINISHES CALL FOR HONING**

**5**

**FREE BOOKLETS**

They show how honing may solve your hole production problem.

tear out coupon now!



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7098

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☐ Have field engineer call for free demonstration.

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# Everyone "Mikes" accurately with a **FEDERAL MIKEMASTER**

**Clamping Ring**  
Deeply knurled. Locks spindle evenly and tightly.

**Tungsten Carbide Anvils**  
Ground, lapped and polished to be flat and parallel.

**Uniform Anvil Pressure**  
Assures consistent accuracy regardless of "feel" of the operator.

**Dull Chrome Plating**  
Provides attractive, long wearing finish and non-glare contrast for barrel graduations.

**Push Button Anvil Retraction**  
Provides ample clearance for quick insertion or instant release of workpiece.

**Tolerance Hands**  
Are set by these two setting screws and colored in red for optimum visibility.

**Accurate Measuring Threads**

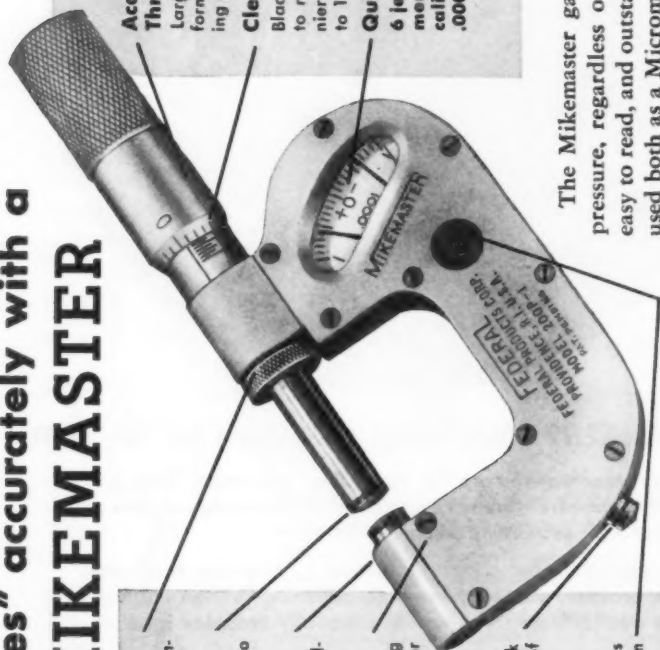
Large, highly precise and uniform; permit easy, accurate, turning of barrel throughout its length.

**Clear Graduations**

Black, sharp, widely spaced; easy to read against dull chrome. Vernier provided for set-up. Range 0" to 1".

**Quick Reading Indicator**

6 Jewel, Low Friction Movement; clearly marked, clearly calibrated scale graduated in .0001".



The Mikemaster gages with the same uniform pressure, regardless of who is using it. It's fast, easy to read, and outstandingly accurate... widely used both as a Micrometer and an Indicating Snap Gage. Try this handy tool on your own work! Send for descriptive folder.

Ask **FEDERAL** First

FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging

**Federal Products Corporation**  
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- 9" column; 3' or 4' arm
- spindle speed ratio of 40-to-1
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- automatic tapping reverse
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- hardened tang slot
- safety elevating nut and screw (arm can't drop or overrun)
- hardened arm ways for head
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*those who buy*  
**GILBERT**  
*buy Gilbert again*

## newest *high-speed* radial

Your many demands for a high-speed light-duty radial are met—completely and economically—by this new Gilbert 3 hp machine. Compare the features at the right with other radials of equal capacity, and you see why the Gilbert is the best buy in its class. Traditional Gilbert accuracy, fast re-

sponse, and wide-angle work visibility make your shop more productive, more versatile. Variety of bases, runway mounting, or tables available. Get all the details in Bulletin 255.

*The Cincinnati Gilbert Machine Tool Co.  
 3340 Beekman Street, Cincinnati 23, Ohio*

Circle No. 203 on Card, Opposite Page 65

# ARMSTRONG

*Quality* **TOOLS**



## ARMSTRONG TOOL HOLDERS

Permanent, multi-purpose tools, for every operation on Lathes, Planers, Slotters and Shapers.



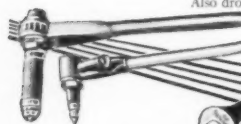
## ARMSTRONG Drop Forged DOGS

Lathe Dogs, Milling Machine Dogs, and Clamp Dogs. 12 types, all sizes



## ARMSTRONG Drop Forged "C" CLAMPS

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Drill Drifts, Tool Posts, Drill Holders, Cutter Grinding Holders, and Tool Makers' Vises.

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ARMALLOY Cast Alloy CUTTER-BITS ARMIDE Carbide-Tipped CUTTERS 6 cutter shapes, 12 sizes—2 grades of hardness.

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6 types with boring bars in sizes for all boring and internal threading work. Hold cutters at 90°, 45° and 30°

## ARMSTRONG THREADING TOOLS

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Better Pipe Tools. A complete line, each a better tool with hardened, alloy or drop forged parts wherever they will add to strength or tool life.

## ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

5208 W. ARMSTRONG AVENUE

CHICAGO 30, ILL.

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MACHINE and TOOL BLUE BOOK

## READER'S GUIDE

MACHINE AND TOOL

**blue book**

NOVEMBER, 1956

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222 E. Willow Avenue Wheaton, Ill.

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### MACHINE AND TOOL BLUE BOOK

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# Always ....



## WAY OUT IN FRONT

For high speed delivery of precision drill jig bushings — smallest to the largest, or specials to your order specify "American."

**AMERICAN HAS ALWAYS BEEN THE LEADER IN MAKING AVAILABLE TO YOU A WIDER RANGE OF A.S.A. and AMERICAN STANDARDS.**

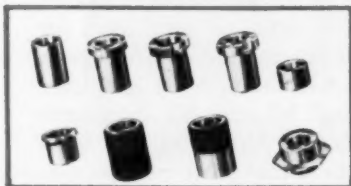
**THERE'S NO LARGER RANGE OF STANDARD BUSHING SIZES**

**THAN** *American's*

*American*

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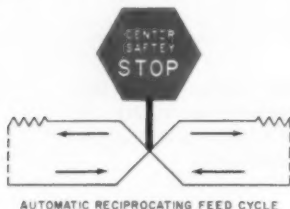
5107 PACIFIC BOULEVARD  
LOS ANGELES 58, CALIFORNIA



Get the catalogs that take the headache out of ordering drill bushings — The original 3-D method of ordering . . . write now for your free copies.



# *Versatility* on this Cincinnati MI *Includes Automatic Milling*



Automatic reciprocal milling setups, with center safety stop, may be assigned to Automatic Cycle Machines. That's because automatic backlash eliminator is a standard feature.

A high production two-fixture setup on a CINCINNATI No. 2MI Plain Automatic Cycle Milling Machine.

Here's a way to turn in a better cost performance record when you have high production milling jobs sandwiched in between toolroom quantity lots. Just assign all of them to a machine equipped for both high production and toolroom milling. ¶ In the 3 and 5 hp class, CINCINNATI® ML and MI Automatic Cycle Milling Machines will give you the best cost performance record you've ever seen. You can use

the automatic table cycles or not, as desired. And for extra high production setups, like the one illustrated here with a fixture at each end of the table, you'll appreciate a CINCINNATI more than ever because of these two advantages:

- 1) Automatic backlash eliminator
- 2) Center safety stop

Both are standard features of the



# CINCINNATI

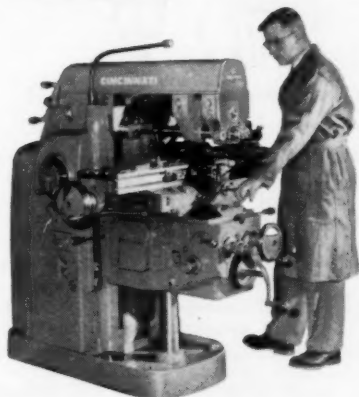
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MACHINE and TOOL BLUE BOOK



ML and MI Automatic Cycle Milling Machines. And for a little extra you can also have *automatic spindle stop*. ¶ These automatic features in no way affect the versatility of the ML's and MI's for small quantity production. You can see why if you will write for catalog No. M-1916-1. Brief data contained in Sweet's machine tool file.

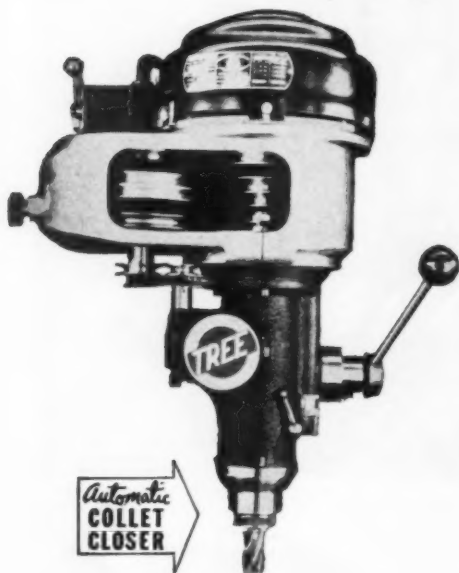
**THE CINCINNATI MILLING MACHINE CO.  
CINCINNATI 9, OHIO**



CINCINNATI No. 2MI Plain Milling Machine. Complete specifications may be obtained by writing for catalog No. M-1916-1.

**MILLING MACHINES • BROACHING MACHINES • CUTTER AND TOOL GRINDERS • METAL FORMING MACHINES  
HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID • GRINDING WHEELS**

# do you need . . . VERTICAL MILLING CAPACITY?



You can add vertical milling capacity by adapting the versatile TREE MH-4 Vertical Milling Attachment to your present horizontal milling machine. The MH-4 gives you all angle milling, drilling and boring with a high degree of accuracy because of its built-in rigidity. Spindle — alloy steel, hardened and ground Roller drive eliminates back-lash. Quill — 4 inch travel. Enclosed micrometer depth stop. Power feed. Write today for full information.

Cincinnati



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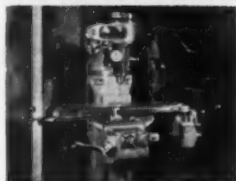
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EXPORT ADDRESS: States Trading Co., 401 Brdwy., New York 13, Cable Address: "STRADESO"

**TREE TOOL AND DIE WORKS**  
1600 JUNCTION AVENUE RACINE, WISCONSIN

# Prutton

## THREAD ROLLING MACHINERY

### 9,000 Tubing Nuts Per Hour!

#### RUNNING 3 SIZES!

1/2" —20 Thread — 5/16" Hole

7/16"—24 Thread — 1/4" Hole

3/8" —24 Thread — 3/16" Hole



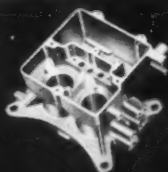
This high speed production operation employed the Exclusive Prutton MANDREL SYSTEM TO SUPPORT THE INSIDE DIAMETER. Similar results can be achieved on your threading with Prutton Thread Rolling Machinery.

Submit your parts for our recommendations. No obligation.

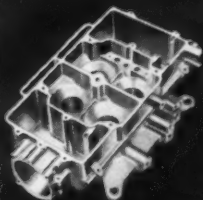
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CLEVELAND 30, OHIO

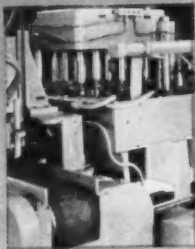
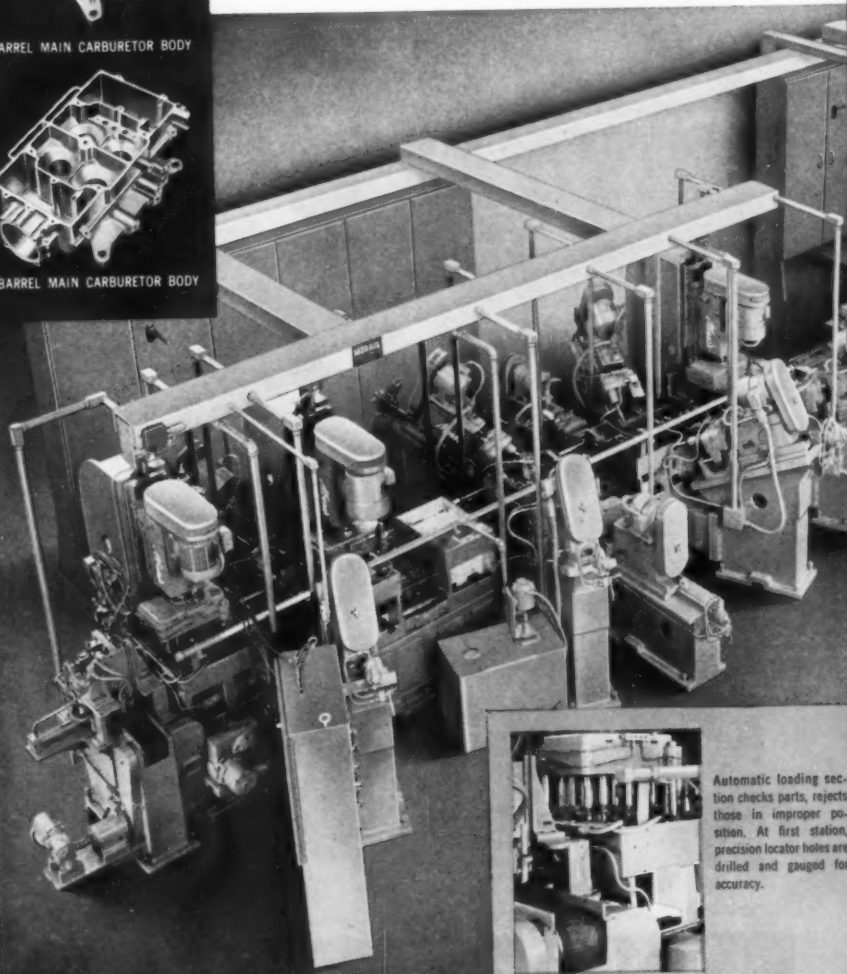


2 BARREL MAIN CARBURETOR BODY



4 BARREL MAIN CARBURETOR BODY

one part completed every



Automatic loading section checks parts, rejects those in improper position. At first station, precision locator holes are drilled and gauged for accuracy.

7½ seconds!



*new*  
**Morris**

IN LINE TRANSFER TYPE  
**HIGH PRODUCTION  
MACHINE**

**480 parts/hour  
56 stations  
90 operations**

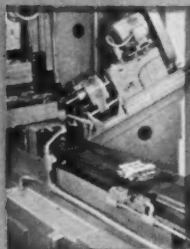
21 DRILLING  
18 BORING  
10 REAMING  
5 GAUGING  
13 PROBING  
13 TAPPING

Fast . . . flexible . . . high speed production of 2- and 4-barrel carburetor bodies is completely automatic on this new MORRIS machine, designed for a major automotive manufacturer.

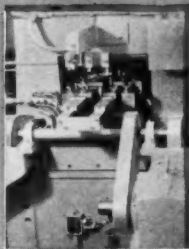
MORRIS designs, engineers and manufactures high production machines, using basic units and automatic drilling units . . . to provide a "special" machine at a fraction of the usual "special machine" price.

Write, outlining your production problem, or send samples of your parts for analysis by MORRIS engineers.

THE MORRIS MACHINE TOOL CO.  
637 HARRIET STREET  
CINCINNATI 3, OHIO



First and second sections may be operated individually or as a single unit. This center section provides automatic unloading and loading as required. Automatic storage may be provided.



Automatic delivery of parts to unloading conveyor (not shown) after machining. Note precision locating pins in fixtures.



**1. Cures "stick-slip" or "jumpy table".** When a table gets the "shakes", especially after it has just reversed or when the load is heavy and the speed slow, it's probably suffering from "stick-slip". Remedy—Sunoco Way Lubricant®. Special polar compounds in Sunoco Way Lubricant form a friction-reducing film that keeps a table sliding smoothly under all operating conditions.



**2. Doesn't squeeze out.** When you use a heavy oil as a way lubricant, you must use a lot of oil to maintain a thick enough film. But, heavy oil squeezes out if the table sits in one position very long. You have a tough time getting the table moving again. Protected by the tenacious thin film formed by Sunoco Way Lubricant, the machine can be idle for a week and it will start easily.

## WHY SUNOCO WAY LUBRICANT CAN HELP CURE YOUR MACHINING PROBLEMS





**3. Protects expensive ways.** Badly scored or pitted ways, caused by inadequate way lubrication, result in lost production and expensive repairs. The high film strength of Sunoco Way Lubricant eliminates the danger of metal-to-metal contact, the chief cause of scoring and way wear. Excellent metal-wetting and non-corrosive properties eliminate rusting and pitting.

**4. Approved by more than 55 machine-tool builders.** Every major machine-tool builder has tested Sunoco Way Lubricant. It is always approved. In fact, to assure maximum efficiency of their product, many manufacturers ship a supply of Sunoco Way Lubricant with each machine. We'll be glad to send you the list of manufacturers who have approved Sunoco Way Lubricant.



For more information, see your Sun Representative, or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MT-11.

Circle No. 212 on Card, Opposite Page 65

INDUSTRIAL PRODUCTS DEPARTMENT

**SUN OIL COMPANY**

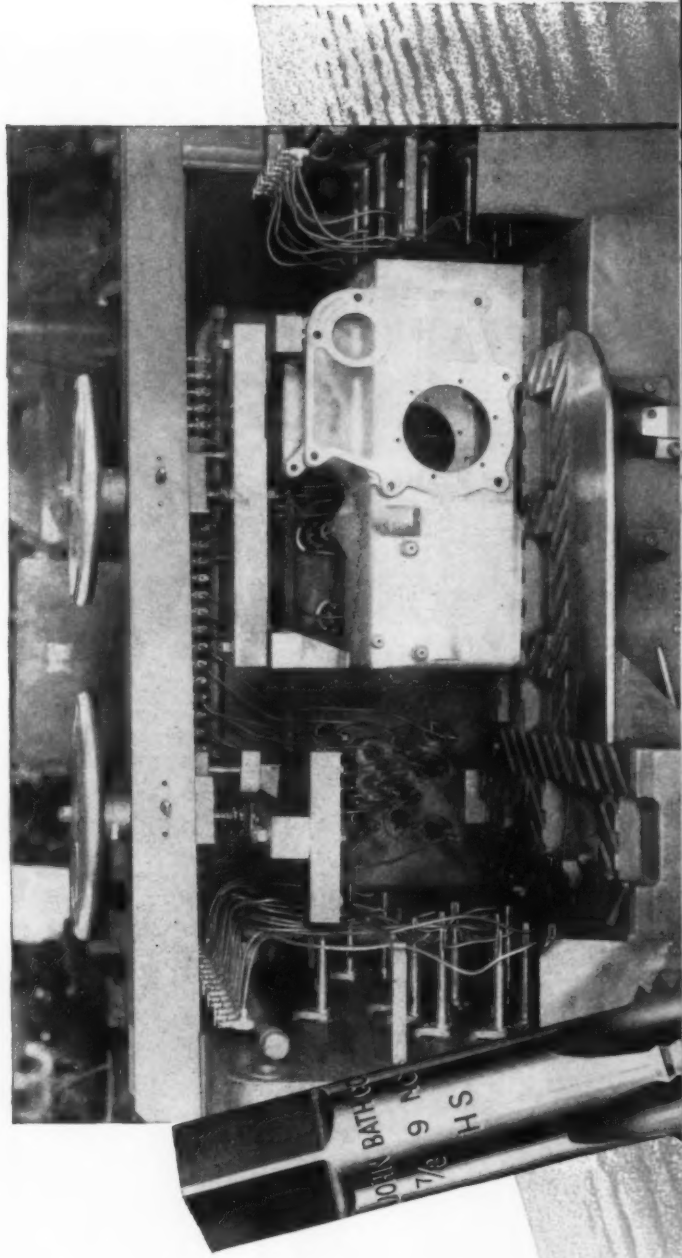
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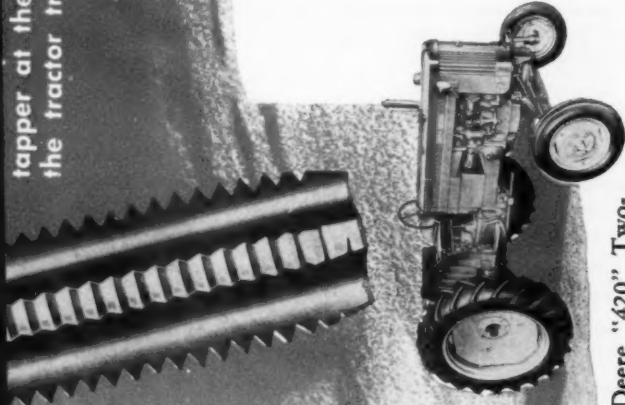
IN CANADA: SUN OIL COMPANY LIMITED, TORONTO and MONTREAL



another Bath Tap job well done  
.... for **JOHN DEERE**



tapper at the Deere Dubuque plant, precision-threads  
the tractor transmission-differential housing.



John Deere "420" Two-  
Row Utility Tractor

The name John Deere has long been associated with farm equipment of outstanding quality.

Maintaining a high standard of part production in Deere plants is mighty important . . . requires selection of top metalworking tools.

Bath is proud to have its taps chosen by Deere . . . where costly "down time" due to inferior tooling cannot be risked.

May we have a Bath representative tell you how to maintain product quality and cut production costs!

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CYLINDRICAL AND THREAD GAGES • GROUND THREAD TAPS • INTERNAL MICROMETERS



# WHY...

Should You Measure To

# MILLIONTHS

OF AN INCH?

All gaging authorities agree that it is necessary to gage to an accuracy 10 TIMES GREATER than the desired working tolerance. Therefore, if your tolerances are .0005" or less, you should use a gage accurate to 50 millionths of an inch to assure proper dimensional control. Conventional mechanical indicators cannot maintain, or repeat this degree of accuracy.

Industry is finding the electronic indicator not only more accurate and repeatable, but also less subject to damage than conventional mechanical indicators. In addition, its simplicity of operation enables any operator, who can use a dial indicator or micrometer properly, to measure accurately to millionths of an inch.

## Simple And Easy To Read To MILLIONTHS OF AN INCH . . .

The INDI-AC ELECTRONIC INDICATOR is merely set to the required dimension with standard gage blocks. The parts to be gaged are then placed under the gage tip and the meter indicates the variations from the desired dimension MAGNIFIED UP TO 10,000 TIMES! Thus it is far simpler and easier to read than a dial indicator or micrometer.

This versatile instrument is used for all gaging purposes such as surface plate or height gage work, checking setups, runout or alignment of parts or machines.

Using the INDI-AC, tolerances which you now estimate will be easy to work to and measure.

**WRITE for further details on the new INDI-AC and  
other Electronic Production Gages, TODAY!**

***Cleveland* INSTRUMENT COMPANY, INC.**  
**736 Carnegie Avenue • Cleveland 15, Ohio**

Circle No. 214 on Card, Opposite Page 65

# DoALL

PRECISION GROUND  
FLAT STOCK

TOOL and DIE STEEL  
AIR and OIL HARDENING

**Cuts Tool, Die, Gage and  
Fixture Costs 22% or More  
By Eliminating Surface Grinding!**

Air Hardening Tough Abrasive Jobs	Oil Hardening Proven Analysis
Carbon ....1.00%	Carbon ....0.09%
Manganese ..0.50%	Manganese ..1.20%
Chromium ..5.00%	Silicon ....0.30%
Molybdenum 1.25%	Tungsten ..0.50%
Vanadium ..0.30%	Chromium ..0.50%
	Vanadium ..0.20%

Size is accurate to: thickness—.001;  
width—.005, —.000, with all edges  
square to face within 10 minutes of  
a degree! 25 micro inch RMS finish  
or better!

**FREE**

## Toolroom Wall Chart

Complete standard  
size listing of all air  
and oil hardening  
Precision Ground  
DoALL tool and  
Die Steel . . . send  
for it today!



Example: you need a 1" x 4" x  
18" piece of oil hardening steel.  
Remembering to order it oversize so  
you can grind away 1/16" scale  
and decarburizing on all surfaces, you  
specify Hot Rolled Steel 1 1/8" x 4 1/8" x 18"  
—\$18.84. You spend for grinding to size and  
overhead \$12.00 (2 hrs. @ \$6.00 per hr.). Total  
cost, \$30.84.

But, you can order the same piece, finished  
ground in Precision Ground Tool and Die Steel  
from DoALL for only \$24.13 and save \$6.71 . . .  
with no danger of rejections and no wasted ma-  
chining and labor time.

. . . and DoALL Tool and Die Steel:

**Keeps ahead of scheduling . . . just ink it, mark  
it, cut it!**

**Is easier to machine . . . saws to any shape on  
a band machine!**

**Simplifies heat treating . . . non-deforming and  
distortion resistant!**

**Prompt delivery . . . over 1000 standard sizes . . .  
local stocks . . . fast delivery on special sizes!**

Save money on your tool and die jobs . . . see  
your local DoALL Sales-Service Store or write for  
further information:

**The DoALL Company, Des Plaines, Illinois**

TS-165



Machines and Sheds



Surface Grinders



Power Saws

Call Your DoALL Service-Store



MEASURING

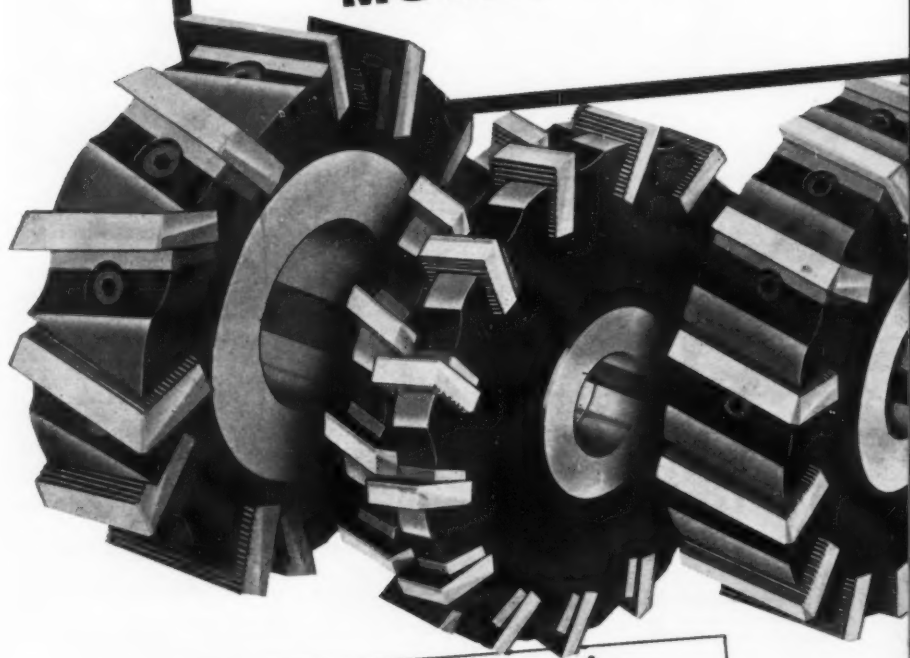


SHOP SUPPLIES

MACHINE TOOLS ..... CUTTING TOOLS ..... INSTRUMENTS ..... IN STOCK

Circle No. 215 on Card, Opposite Page 65

*... and AGAIN*  
**MORSE**  
**MOVES AHEAD...**



*Another reason why*  
**MORSE**  
*means*  
**"THE MOST"**  
*in Cutting Tools*

# *with a Complete Line of* **Inserted Blade CUTTERS**

This new Morse line is complete . . . every standard type and size, plus any special up to 36"! And this new line makes the Morse-Franchised Distributor *more than ever* "the man with the most" in cutting tools.

**MORSE TWIST DRILL & MACHINE COMPANY • NEW BEDFORD, MASS.**

*Subsidiary of VAN NORMAN INDUSTRIES, INC.*

*Warehouses in New York, Chicago, Detroit, Dallas, San Francisco*



**Circle No. 216 on Card, Opposite Page 65**



# ROCKWELL-BUILT **TWO NEW DELTA**

## **ALL NEW DELTA 15"**

*World's most versatile  
drill press for all-around shop use—extra  
rugged for production work!*

**WORLD'S MOST COMPLETE LINE**—Choose from the world's widest range of models for every production and shop need: floor, bench, multiple-spindle set-ups—production or standard table—plus a complete line of components for adapting to special-purpose operations.

**AMAZING VERSATILITY**—Only Delta gives you a selection of *six* spindle adaptors for dozens of operations. And they're mounted on a ground taper for *complete* accuracy, feature a threaded collar for *positive* locking.

**EXCLUSIVE "UNIVERSAL" HAND FEED**—Only Delta combines the best features of pilot wheel and single lever feeds with an exclusive universal hand feed. Gives you adjustable leverage—freedom from striking table or fixtures—almost infinite choice of feed lever positions.

**BUILT FOR PRODUCTION WORK**—Spindle has four over-sized, pre-loaded, lubricated-for-life ball bearings for *extra* ruggedness. Big 2" dia. quill and massive one-piece head casting provide greater rigidity. Multiple-spline "floating drive" minimizes vibration, assures smoother operation.



another product by  
**ROCKWELL**



# DRILL PRESSES!

## GREAT NEW DELTA 20"

**Designed for production tooling—  
a big-capacity, heavy-duty drill press  
that's built to last!**

**BIG CAPACITY**—You get full 6" spindle travel with 5½' high column for additional spindle-to-table capacity. Choose from a complete line: floor, bench, multiple-spindle models—production or standard table—No. 2 or No. 3 Morse Taper Spindle.

**RUGGED, ACCURATE**—Double row, pre-loaded heavy-duty ball bearing close to the work load eliminates spindle play, assures years of lasting accuracy. Big 3¾" dia. centrifugally cast iron column with ½" thick wall is precision ground to size to give rigid backbone to machine, and extra weight for smooth, efficient operation.

**SAFE, SIMPLE OPERATION**—Molded, reinforced fibre glass belt guard completely encloses belt and pulleys, swings out of way for fast speed changing. Guard will not dent like steel, crack like iron, rattle like iron or steel. Quick-set depth gage with magnified scale is easy to see, easy to read.

See the great new Delta 15" and 20" Drill presses—compare with any others, then make up your own mind! Your Delta Dealer is listed under "TOOLS" in the Yellow Pages of your phone book.

**Send coupon for all the facts!**

Delta Power Tool Division,  
Rockwell Manufacturing Co.  
6101 N. Lexington Ave., Pittsburgh 8, Pa.

☐ Please send me complete information on new Delta 15" and 20" Drill Presses.

☐ Please send name of my nearest Delta Dealer.

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Company \_\_\_\_\_

Address \_\_\_\_\_

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## One Man Removes Large Punch Holder in 3 Minutes!

with SUPERIOR

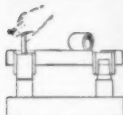
### REMOVABLE CAP GUIDE PINS

#### End Troublesome Binding in Die Set Assembly

Superior's Removable Cap Guide Pins eliminate punch holder binding on guide posts when parting dies. The cap is removed from the pin merely by loosening a socket head screw which holds the cap in place. This frees the punch holder at the most critical point of the pin where it is apt to cock or bind. Instead of needing 2 or 3 die makers to remove the punch holder from a set, one man can easily do this work alone in a few minutes.

NOW OFFERED IN PIN DIAMETERS OF 1/4" UPWARD, AS STANDARD EQUIPMENT ON ALL SUPERIOR DIE SETS. SPECIFY IF DESIRED. WRITE FOR COMPLETE FREE INFORMATION.

**FAST**



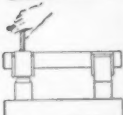
REMOVING CAP

**SAFE**



PARTING DIE SET

**ACCURATE**



REPLACING PUNCH  
HOLDER



For Fast Local Service Call These

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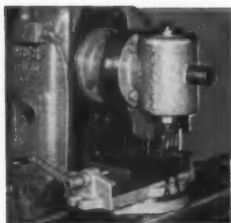
Expert Superior Representatives

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- Winter Park, Fla. Phone 5-0464
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- Brooklyn, N.Y. NAvarre 8-6690

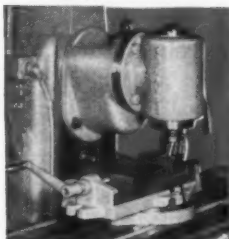
PLANTS AT

- Milwaukee, Wis. Mitchell 5-6027
- Plainville, Conn. SHERwood 7-2701

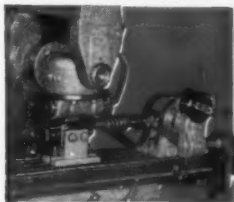
**SUPERIOR** STEEL PRODUCTS CORP.  
2754 S. 19th ST. MILWAUKEE, WIS.



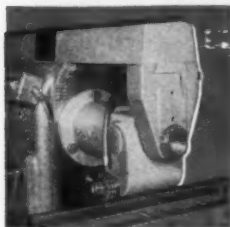
Heavy Duty Vertical  
Milling Attachment



Heavy Duty Offset  
Vertical Milling Attachment



Universal Milling Attachment



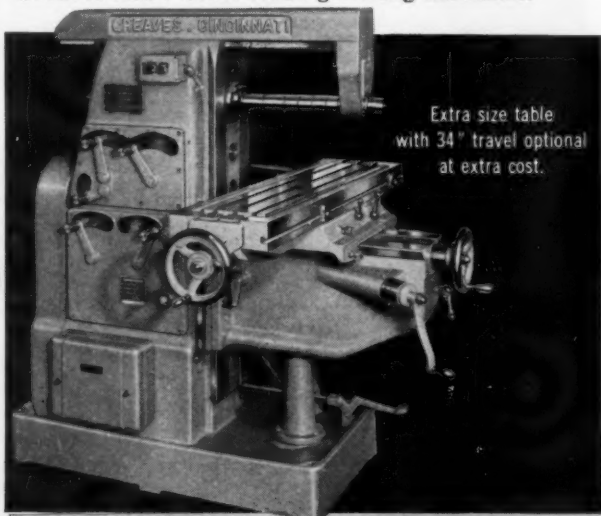
Rack Milling Attachment

**Heavy duty attachments  
increase versatility  
of dependable, low-cost**

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**"THE MOST MILL FOR THE LEAST MONEY"**

A full line of attachments and accessories offer outstanding flexibility for all types of milling operations . . . with GREAVES MILLS. Make your own comparison of 22 specifications of Greaves and 7 other leading milling machines.



Extra size table  
with 34" travel optional  
at extra cost.

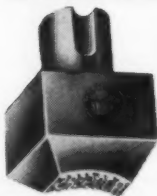
**GREAVES MACHINE TOOL CO.**  
2600 Eastern Avenue, Cincinnati 2, Ohio

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Send information on Attachments and Accessories for GREAVES MILLS.

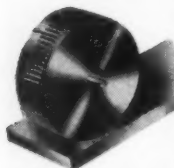
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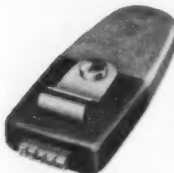
# MATTHEWS MARKING *Products*



Full line of stamping and embossing steel dies in any size to suit your needs.



Roller dies engraved to your specifications—may be mortised for interchangeable inserts.



6 styles of Standard Steel Type Holders for light to heavy duty service.



Portable and motorized bar, tube and sheet Printing units, with permanent or soluble inks for every application.



"every  
need  
for every  
industry"

Matthews General Purpose Machines mark round or flat parts up to 6" diameter—models from hand operated to pneumatic-hydraulic to mark up to 800 pieces per hour.

High production machines produce thousands of marks per hour on round, solid or hollow parts. Fully automatic.



**JAS. H. MATTHEWS & CO.**

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**Write for literature and catalogs for your applications.**

Circle No. 220 on Card, Opposite Page 65

get **DOUBLE ACTION** with...

## HELLER NUCUT<sup>®</sup> Wavy-Teeth<sup>®</sup>

### FILES

#### OVERCUT

The "overcut" creates a pattern of coarse and fine teeth.

HELLER Nucut Wavy-Teeth design combines both coarse and fine teeth in the same file to give fast stock removal and leave a smooth finish.

The coarse teeth cut fast, take a good bite, while the fine teeth break up the chips and permit quick clearing from the file.

This DOUBLE ACTION makes it possible to file with less effort and remove more metal with fewer strokes. Loading is minimized, chatter reduced and a smoother finish produced.

This is why HELLER Wavy-Teeth files are easier to use, last longer, cut filing costs. It will pay you to ask for HELLER NUCUT WAVY-TEETH next time you order files!

When the "upcut" is added the "Wavy-Teeth" is designed.

# HELLER TOOL CO.

*Subsidiary of Simonds Saw and Steel Co.*

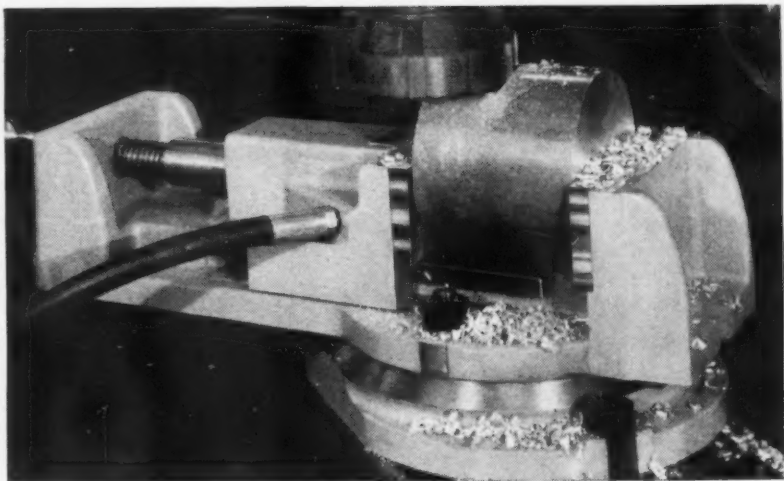
**NEWCOMERSTOWN, OHIO**

BRANCHES: New York, Detroit, Chicago, Los Angeles



YOUR HELLER DISTRIBUTOR CAN SUPPLY ALL YOUR FILE NEEDS

Look  
for the  
Heller  
White  
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## Bites Like A Bear 800 Times An Hour

The MilOMATIC Power Vise cuts loading time 80% and has a locking force of 9000 lbs. at normal air line pressure. This fast, strong, air powered hydraulic clamping means more production, less labor per piece on milling, drilling, grinding, shaping, broaching, and other machine applications. Milomatics eliminate expensive tooling when specially shaped jaws are installed.

*Ask your local distributor, or*

**Attach this Ad to your letterhead for a free ten day trial or free literature**

*There is absolutely no obligation to you.*



**WILTON** TOOL MFG. CO., INC.  
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WILTON TOOL CANADA LTD. GUELPH, ONTARIO, CANADA

SOLD BY LEADING DISTRIBUTORS THE WORLD OVER



# ELIMINATE

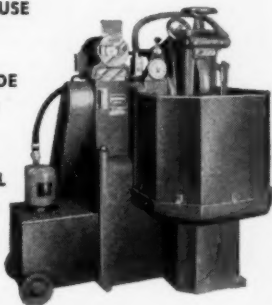
## Costly "Guess Work"

WITH THE

# Oliver TEMPLATE

TOOL BIT GRINDER

- POSITIVE DUPLICATION ASSURED BY USE OF A MASTER TEMPLATE.
- GRINDING ON SINGLE POINT CARBIDE TOOLS REQUIRES SECONDS INSTEAD OF MANY MINUTES.
- 20" NOTCHED SILICON CARBIDE WHEEL ELIMINATES DIAMOND FINISHING OPERATION IN MOST INSTANCES.
- MACHINE IS EQUIPPED TO PROVIDE WATER BOTH THROUGH THE WHEEL AND ON THE WHEEL FOR CARBIDE GRINDING.
- CAPACITY: TOOL BITS UP TO  $1\frac{1}{2}$ " WIDE x  $1\frac{3}{4}$ " HIGH.
- SPECIAL SHAPES AND SIZES MAY BE HANDLED IN SPECIAL HOLDERS.



Write for Brochure . . . Complete Information.

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• COMPANY

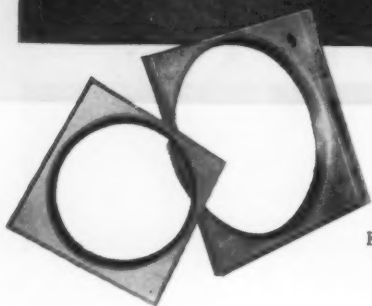
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ADRIAN, MICHIGAN

FACE MILL GRINDERS • AUTOMATIC DRILL GRINDERS • DIE MAKING MACHINES  
TOOL & CUTTER GRINDERS • DRILL POINT THINNERS • TEMPLATE TOOL GRINDERS

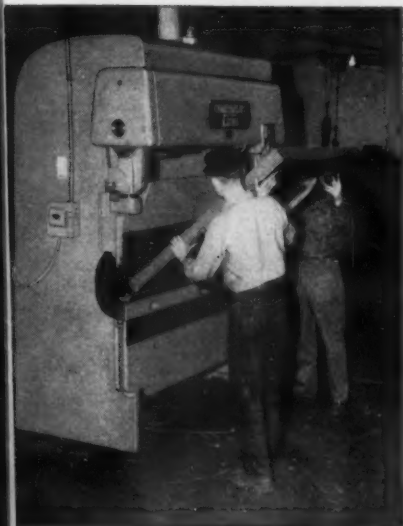
This accurate Cincinnati



Fan casings.



Press Brake saves money and time...



at ANCHOR METAL SPINNING CO.  
Dayton, Ohio

Profitable production has been achieved by installing this Cincinnati Press Brake.

Accurate flanging of fan housings is done rapidly while meeting the rigid requirements for squareness. Operations on different sizes and gauges of materials are performed with ease. Parts for assembly are ready on time and smooth shop operation maintained.

Photos courtesy of Anchor Metal Spinning Company.



Write for Bulletin "2. New Cincinnati Press Brakes" for complete information on these versatile machines.

**THE CINCINNATI SHAPER CO.**

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES



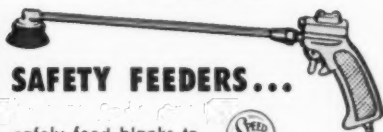
## AIR OPERATED

### LITTELL units

- SAVE MONEY
- SAVE FINGERS
- SAVE HANDS
- SAVE TIME

... WITH dependable air operated safety units by Littell

## Pres-Vac



### SAFETY FEEDERS...

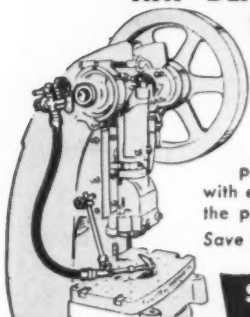
safely feed blanks to press from the safe distance of 14 inches — BY AIR!

Save those fingers.



**\$35.00**

### AIR BLAST VALVES...



eject parts safely with each stroke of the press — BY AIR!  
Save those hands.

**\$29.00**

### NEWEST LITTELL UNIT

### SHEET LIFTERS..

handle sheets of steel, glass, plywood, boxes, cabinets, etc. Safely —

Save those Insurance Premiums.



**\$32.00**

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**LITTELL**  
MACHINE  
CO.

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CHICAGO 13, ILLINOIS

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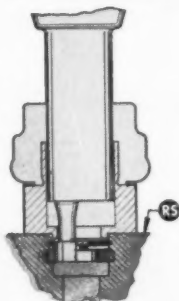
Write for FREE Catalog



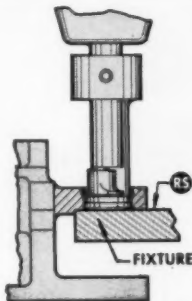
## LITTELL Also Makes These Punch Press Accessories

- ROLL FEEDS
- REELS
- STRAIGHTENING MACHINES
- COIL HOOKS

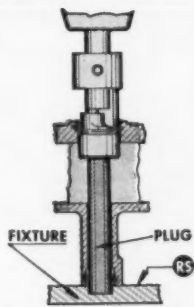
## Even Unskilled Labor Can Use This Versatile Tool Accurately! It Simplifies Internal Grooving Problems, Cuts Production Costs!



A) Cuts two grooves of different depths and widths in one single operation from same reference surface.



B) Cuts groove in bore located in protruding member of workpiece. Reference surface on under side of protrusion.



C) Cuts grooves in two bores of different diameters from same reference surface. Tool banks on reference surface. Then workpiece is reversed and tool banks on plug.

**Amazingly versatile!** Your toughest recess cutting problems can be met simply and efficiently with the Waldes Truarc Grooving Tool because it offers a whole range of possibilities beyond the range of ordinary recessing tools.

**Wide Cutting Range!** The Waldes Truarc Grooving Tool comes in 5 models...enabling you to cut accurate grooves in housings with diameters from .250 to 5.00 inches.

**Send Your Problems to Waldes!** Send us your blueprints...let Waldes Truarc Engineers give you a complete analysis, price quotation and delivery information on the most economical tool set-up for your particular job. There is no obligation!

Write NOW for a 20-page manual containing full information on Waldes Truarc Grooving Tool



**WALDES**  
**TRUARC**  
**GROOVING TOOL**

Made by the Manufacturers of Waldes Truarc Retaining Rings  
WALDES KOHINOOR, INC., 47-16 Austel Place, L.I.C. 1, N. Y.

Waldes Truarc Grooving Tool Manufactured  
Under U. S. Pat. 2,411,426

Waldes Kohinoor, Inc., 47-16 Austel Pl., L.I.C. 1, N. Y.

Please send me your new 20-page technical manual on the Waldes Truarc Grooving Tool. MT-118

Name

Title

Company

Address

City  Zone  State

Circle No. 226 on Card, Opposite Page 63

"we concentrate on Niagara



**NIAGARA**

**DOUBLE CRANK STRAIGHT**

*America's most complete line of presses, press brakes, shears, other machinery and tooling for the metalworking industry*



# presses...

In-line operation of four Niagara Series SC-2 Presses, engaged in progressive production of automotive side moldings from 625" / 430 stainless steel.

Press operator shows a blank and formed molding which will grace one of the "Big Three" cars.



## SIDE PRESSES

## ...they require a minimum of maintenance"

Producing up to 1,750,000 automotive moldings per month, these four Niagara Double Crank Straight Side Presses do the work of eight for a large Midwestern metal stamping firm. Their long beds enable the outfitting of each press with two sets of dies for two separate operations.

"We believe in standardizing. That is why we concentrate on Niagara Presses. They require a minimum of maintenance. When jobs come in, we are sure we can get them out. They are a volume machine," says the vice president and plant superintendent.

... and with good reasons, this famed line of Niagara presses requires a minimum of maintenance:

- *Rugged, integral, all-welded steel frames of exclusive triple box section design properly resist deflection to assure greater accuracy and longer die life.*
- *Laminated non-metallic ways of box type welded steel slides are a positive safeguard against scoring and assure trouble-free service.*
- *Low inertia pneumatic friction clutch reduces heat and wear. Only the shaft and driving plate are started and stopped at each cycle. Most of the clutch weight continues to rotate with the flywheel.*
- *Outboard mounting of clutch makes it accessible for easy maintenance ... without disturbing any drive or crown parts.*
- *No adjustment for wear of clutch plate is necessary. It is self-compensating.*
- *Clutch linings are cycle-welded to plate, without rivets, increasing effective life.*
- *Brake shoes are full floating and self-aligning ... cannot cock, bind or wear unevenly.*
- *Steel gears run in totally enclosed oil baths. Centralized pressure lubrication sends vital oil to journals, ways and wherever necessary for long efficient, service life.*

Like this well known metal fabricator, it will be profitable for you, also, to consider standardizing on Niagara presses. First of all, Niagara has the most to offer ... straight side double crank, single crank and eccentric geared, open back inclinables and dozens of others. Secondly, in the words of the same company's purchasing agent: "The prices on Niagara Presses are right ... and they do the job."

Built in 50 through 400-ton capacities, Niagara Double Crank Straight Side Presses are readily equipped with automatic feeds, variable speed drives, iron hands and other automatic materials handling devices so popular with the automotive and appliance industries. Post yourself on this important line by requesting Bulletin 64.



**NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.**

DISTRICT OFFICES:

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the **MASERATI**

SIZES

2

3

4

# **M** HORIZONTAL & VERTICAL MILLING MACHINES

**POWER**

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**PRECISION**

**ECONOMY**



Manufactured by highly skilled specialists

- Power rapid traverses in all directions
- Wide range of speeds and feeds
- Dual automatic selection of speeds and feeds
- Dual controls for all power feeds and rapid traverses
- Dual controls for clutch and brake

COMPLETE INFORMATION AVAILABLE

Write for Detailed Specifications Today  
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Dept. B Maserati Corporation of America, Westbury, N.Y.



Circle No. 228 on Card, Opposite Page 65

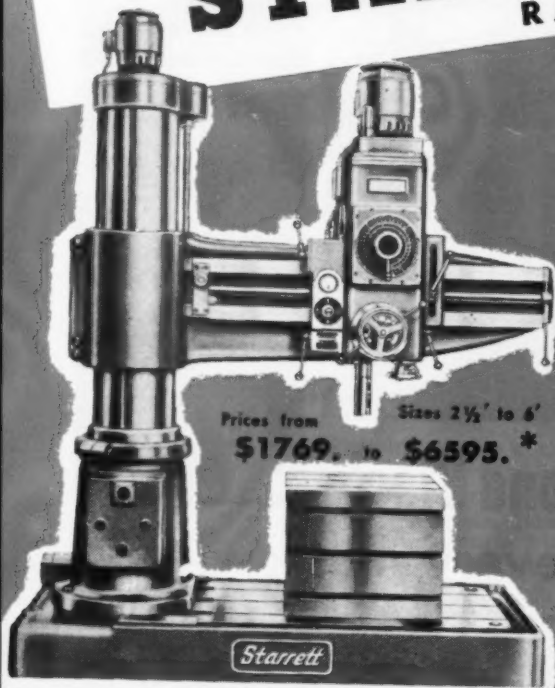
MACHINE and TOOL BLUE BOOK

**BEST VALUES  
IN U.S.A.**

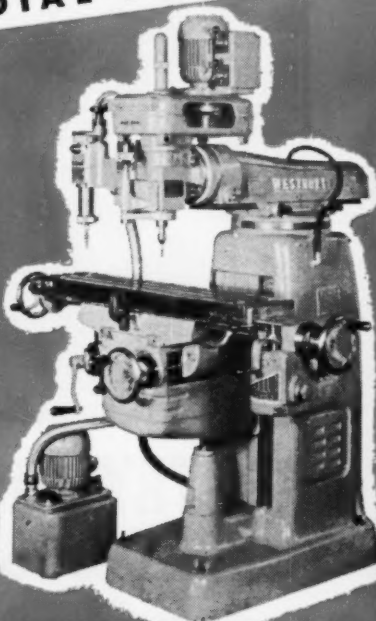
**NEW FEATURES . . . HIGH QUALITY . . .**

# STARRETT

**RADIAL DRILLS**



Prices from \$1769. to \$6595.\*  
Sizes 2½" to 6"



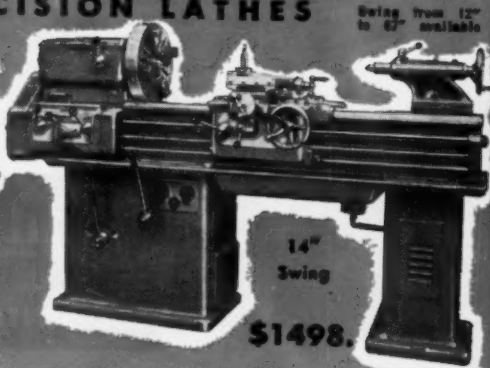
**CONTOUR MILLER**  
with hydraulic high speed vertical  
duplicating head. **\$2,990.**

## IMPERIAL PRECISION LATHES



12" Swing

**\$1298.**



14"  
Swing

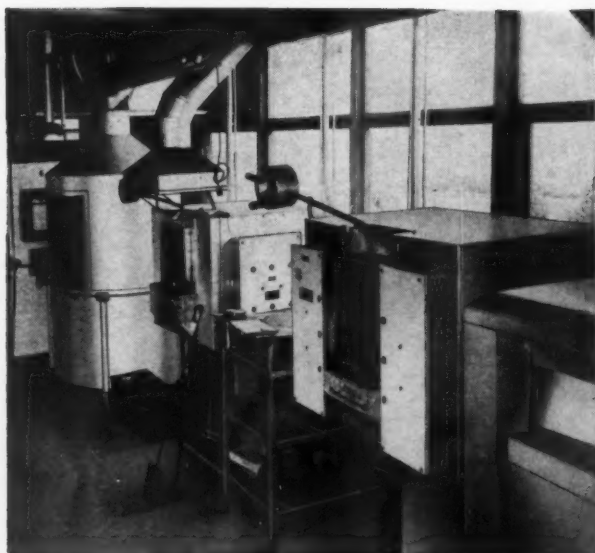
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**AARON MACHINERY CO. INC.**

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slightly higher—West Coast Branches at: Buffalo N.Y. Mineola N.Y.

**Liberal Terms • Rental Plans**

See page 53  
Los Angeles, Calif.



REAMER



DIE



ROTARY FILE

## SENTRY Diamond Blocks ...a size for every tool!

For maximum economy and satisfaction of operation, select the SENTRY Diamond Block best suited for the size tool you heat treat.

However, if you do not have a SENTRY Furnace as yet, it can be difficult to imagine the high degree of hardening perfection the SENTRY Diamond Block Atmosphere can achieve for you on your High Speed or High Carbon High Chrome steel tools.

We suggest the use of the proper

SENTRY Diamond Block for a specific size tool, because we know SENTRY owners are perfectionists. They want the best — that's why they bought the best: SENTRY Furnaces!

If you want perfection, simplicity of operation, outstanding economy and the ultimate in heat treating quality . . . then YOU want SENTRY — SENTRY Furnaces and SENTRY Equipment!

Learn about the best. Compare it with the rest. Send for



Request  
Catalog  
G-27

Write →

# Sentry

TRADEMARK



ELECTRIC FURNACES

THE SENTRY CO. • FOXBORO • MASS.



## Wilson "Tukon" Micro Hardness Testers

**UNEXCELLED**  
*for testing fine parts...*  
**METALLIC and  
NON-METALLIC**

**Model LR**—Floor model for  
Micro and Macro Hardness Testing.



●WILSON "TUKON" Micro Hardness Testers meet every fine test requirement. These precision instruments are invaluable in the proper testing of fine precision parts, fine wire, thin metal, shallow superficially hardened surfaces, jewels, plastics, glass, etc. WILSON "TUKON" testers operate with both Knoop and 136 degree Diamond Pyramid Indenters.

### Consult with WILSON Engineers

Experienced WILSON Engineers will be glad to help you select the proper model for your particular requirement. This choice depends on the type and thickness of work to be tested, range of loads and other hardness testing equipment available.

Write for Booklet **DH-328** on WILSON "TUKON" Micro Hardness Testers. Ask for **DH-325** on WILSON "ROCKWELL" Hardness Testers.

### WILSON "ROCKWELL"...

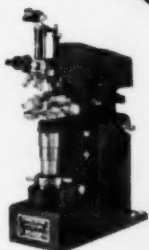
the world's standard of hardness accuracy



**Wilson Mechanical Instrument Division  
AMERICAN CHAIN & CABLE**

230-T Park Avenue, New York 17, N. Y.

Circle No. 231 on Card, Opposite Page 65



**Model MO**—  
Table model  
for Micro  
Hardness  
Testing.  
(Mechanical-  
ly operated)



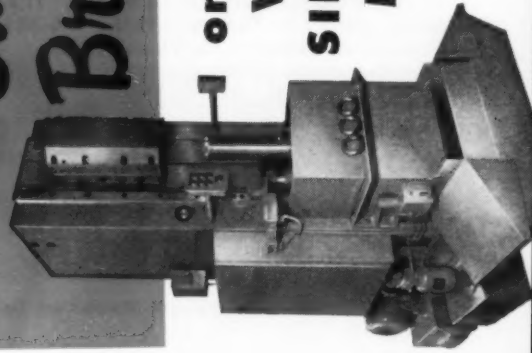
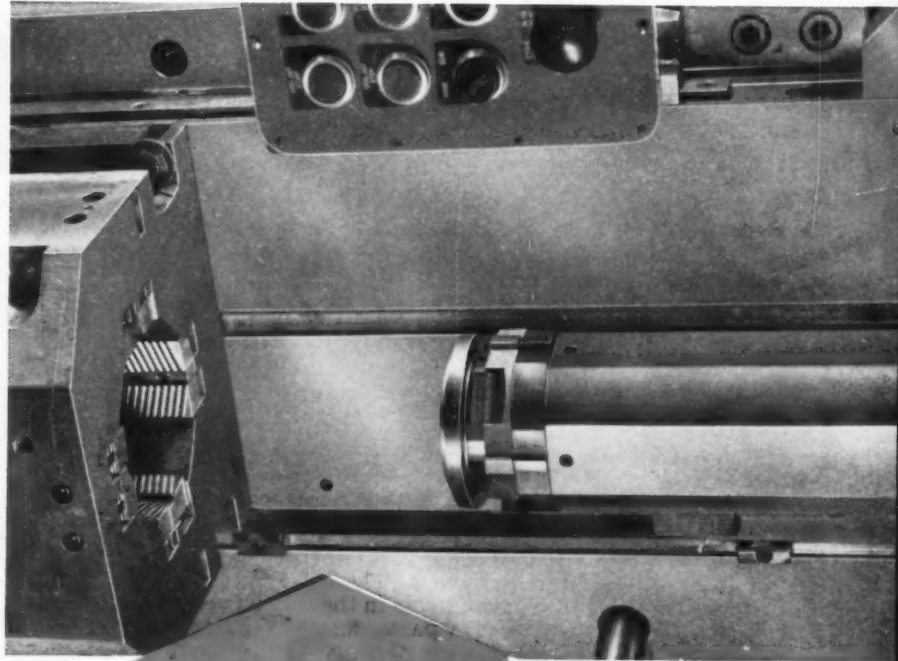
**Model FB**—Floor model for  
Micro Hardness Testing.  
(Electrically operated)



**UNUSUAL TOOLING  
SETUP FOR**

# *External Surface Broaching*

**on DETROIT  
VERTICAL  
SINGLE RAM  
MACHINE**



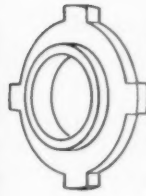
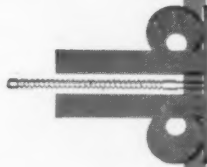
This broaching job requires rigidity and perfect alignment . . . which makes it a "natural" for the massive Detroit Vertical, built and tooled by experts. Note the safety feature which prevents the main slide from descending until dual push buttons have been operated. This slide holds the heavy, pot-type broach holder in perfect alignment with the fixture post, which is mounted on a fixed knee for even greater accuracy.

Detroit Vertical Single Ram machines are available in standard capacities from 5 to 25 tons, stroke length from 30" to 90". Interchangeable knees with shuttle table mechanism can readily convert this machine into a standard for future production needs. Oversize platens on all standard models allow multiple as well as single station tooling.

Detroit builds every size and type of broaching machine, automates and tools them to fit your needs. Call in a Detroit field engineer, or send us details of your production problem . . . today.



Write for new  
free bulletin on  
Detroit Vertical  
Single Ram Machine



**PART**—Automotive transmission component.

**OPERATION**—Broach 4 external lugs, equally spaced.

**TOOLING**—Pot-type broach holder, built in sections for convenient tool assembly . . . in perfect alignment with fixture post.

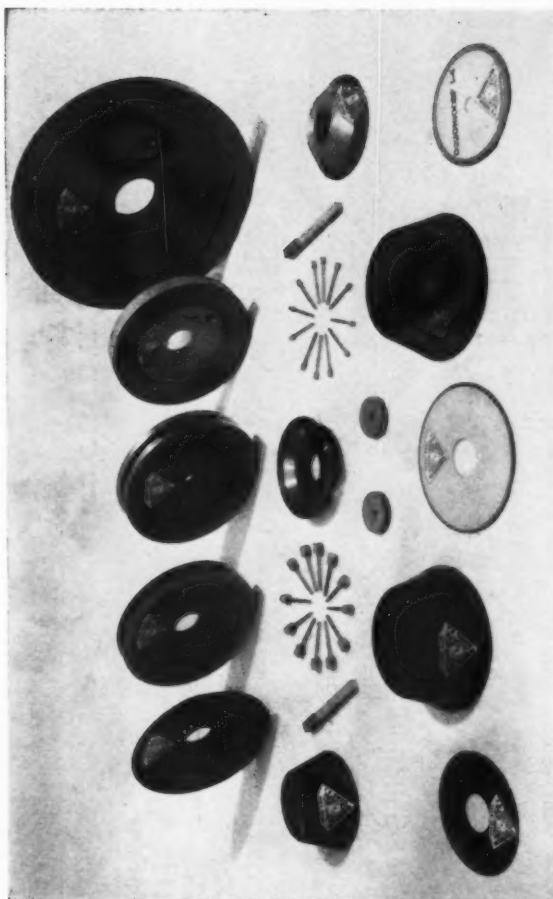
**CYCLE**—Operator loads work over fixture on top of post, starts machine. Broach holder descends with ram and bottoms after cutting stroke. Operator unloads work and presses palm button for return stroke.

**PRODUCTION**—120 parts per hour.

**MACHINE**—Detroit 10-ton Vertical Single Ram Broaching Machine with 42" stroke and fixed knee.

**DETROIT  
BROACH  
& MACHINE COMPANY**  
DEPARTMENT Q-11  
ROCHESTER, MICHIGAN





**ACE OF DIAMONDS**  
brand diamond wheels  
frontrunners for excel-  
lence in American In-  
dustry. Assures you of  
the finest — maintained  
through modern facili-  
ties and rigid standards.  
**ACE OF DIAMONDS**  
a name to remember!!

**Products of  
over 30  
years  
experience**

**MANUFACTURERS OF :**

**Resinoid - Metal - Vitrified  
Diamond Wheels**

**Powdered Metals  
Allied Products**



TELEPHONE: VErona 8-7406  
**THE PAUL L. KUZMICK CO.**  
271-279 GROVE AVE., VERONA, N. J.

Circle No. 233 on Card, Opposite Page 65





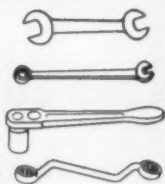
**WILLIAMS  
PATENTED  
LOCKING  
FEATURE**

**Has Won Preference  
of Mechanics  
Everywhere**

From personal experience, these men know that nothing matches the rapid one-hand adjustment which "locks-in" simply and positively for a safer, surer grip. Only Williams locking adjustable has it and . . . *at no extra cost.*

Order 6, 8, 10 and 12" sizes through your local distributor for fast, low cost delivery.

**J. H. WILLIAMS & CO., 409 Vulcan St., Buffalo 7, N. Y.**



**WILLIAMS**  
**INDUSTRIAL TOOLS**  
*"The Broadest Line of Its Kind"*



Circle No. 234 on Card, Opposite Page 65



## Verson Model 1062 Press Brake, \$2,630.00\*, *available from stock*

● It doesn't take weeks and months to have this press brake delivered. Standard Verson Model 1062 Press Brakes are in stock. You can get them right off the shelf! Just pick up your phone and order.

Famous Verson quality and design are built into this press brake and its smaller companion, the 16-48. Big brake standards of construction provide an economical answer to a wide variety of jobs in both large and small shops.

Verson Model 1062, 16 ga. by 78" capacity, is priced at \$2,630.00\*; Model 16-48, 16 ga. by 48" capacity, is \$1,600.00\*. Order yours today. Both are available from stock!

\*Prices, F.O.B. Chicago, less dies; subject to change without notice.



ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

**VERSON ALLSTEEL PRESS CO.**

9303 S. Kenwood Avenue, Chicago 19, Illinois  
8300 S. Central Expressway, Dallas, Texas

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES  
TOOLING • DIE CUSHIONS • Verson-WHEELON HYDRAULIC PRESSES

Circle No. 235 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

Why pay  
for bulk  
you  
don't need...



**FULMER MACHINES MEET EVERY HONING DEMAND**

**WEIGH LESS...TAKE UP LESS ROOM...COST FAR LESS!**

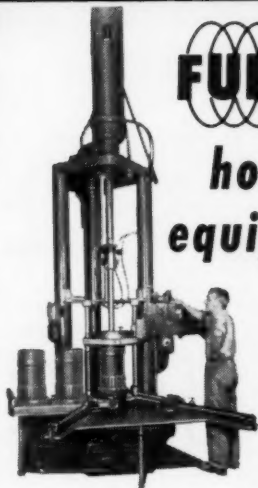
A tremendous hulk of cast iron may look impressive...but it adds nothing to honing...except cost! Fulmer Honing Machines are scientifically engineered to provide maximum output and accuracy at lowest cost. "Beef" is put where it's needed most, for example: in the rugged power transmission system...and "streamline" where design dictates—in the columns, for example.

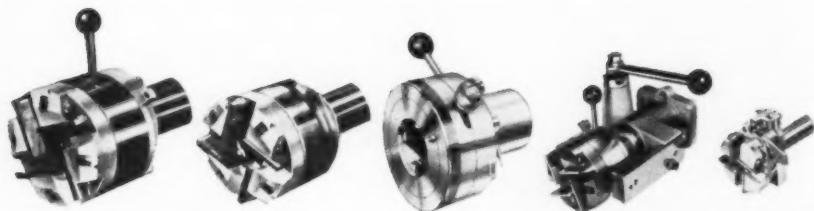
This is only one of many reasons why Fulmer Honing Machines may be as little as one-half the cost of other makes—yet equal or exceed them in rate of stock removal, accuracy of parts honed, ease of operation and quick set-up. Oversize parts, such as gears and bearings, stand up under three shifts a day operation...7 days a week...for years, with little or no service needed.

Fulmer precision honing of internal bores offers amazing savings over other finishing methods. Write for bulletin on honing to: C. Allen Fulmer Co., Dept. B 107 E. 4th St., Cincinnati 2, Ohio.

**FULMER**

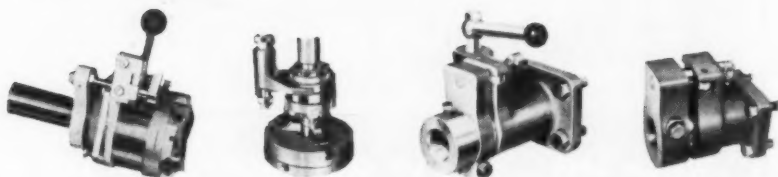
**honing  
equipment**





**DIE HEADS** • Automatic opening tangent stationary and revolving types, tangent taper receding, radial stationary, hollow milling, B&S and small turret lathe types.

# Jones & Lamson's thread



**ACCESSORIES** • External and internal trip attachments, drill press adapters, floating holders.



**SHARPENING EQUIPMENT** • Chaser sharpening machine, sharpening fixture, measuring gages.

Class III threads guaranteed . . . every time!

# JONES & LAMSON

JONES & LAMSON MACHINE COMPANY, 520 CLINTON ST., SPRINGFIELD, VT. U. S. A.

Circle No. 237 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

Jones & Lamson recently purchased the Modern Tool Works, Rochester, N. Y. This acquisition greatly broadens J&L's service in the thread tool field, by integrating the products and designs of both companies.

Now, J&L, operators of the world's most modern thread tool plant, offers you its own complete lines of die heads and chasers, accessories and sharpening equipment, plus a line of collapsible taps and chasers, solid adjustable taps and chasers, the Modern-Magic Chuck, and the Modern Stud Setter. Complete engineering service is also offered for the entire new combined line of products.

Send today for complete literature.

## tool line now includes...

### J&L MC COLLAPSIBLE TAPS

The same tap may be used on either stationary or rotating jobs. One complete tap, plus parts, gives you five sizes of taps ranging from  $1\frac{1}{16}$ " to  $3\frac{1}{4}$ ".

### J&L MS SOLID ADJUSTABLE TAPS

With ground-thread, precision chasers. Chasers can be removed from tap, reground and reset to cut to original size.

### MODERN- MAGIC CHUCKS...

Positive or adjustable friction drive for horizontal or vertical use. MODERN-MAGIC Quick Change Chucks and Collet Equipment virtually eliminate costly idle time of revolving spindles. Using these chucks, tools can be changed without stopping or even slowing the spindle. They give multiple spindle range to single-spindle machines. For instance: you can change collets as fast as you can index a turret.

### AND COLLET EQUIPMENT

### J&L STUD SETTERS

The new Style M Self-Opening Stud Setter's four-ball drive clutch gives more positive disengagement for more accurate stud heights.

# MACHINE COMPANY

THREAD TOOL DIVISION

# INDEX

*short or long runs on a production basis*

*with Hartford Special*

## SUPER-SPACERS

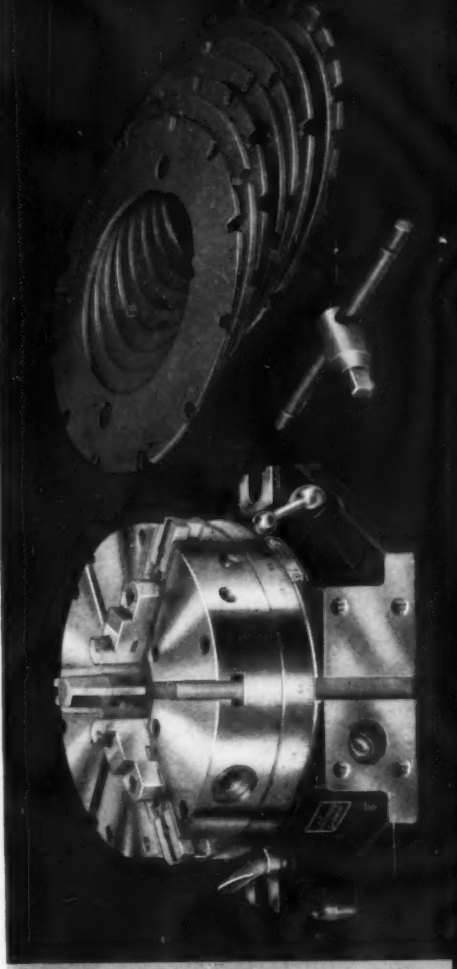
- Quick, easy setups without expensive jigs or fixtures.
- Positive, rapid indexing accuracy in a minimum of .00116" on a 4" radius, noncumulative.
- Super-Spacer can be indexed visually to any degree setting with Vernier accuracy, and locked in position.

### 12" SUPER-SPACER

Length overall: 16"  
Width overall: 12½"  
Base to chuck face: 6½"  
Width of keys: 1½"  
Thru hole diameters: 4"  
Chuck diameter: ½" thru 12½" O.D.  
Weight: 190 lbs.

Mask plates for divisions from 2 through 27 are available from stock. 2, 3, 4, 6, 8, 12, 16 and 24 notch plates are furnished with the standard unit. Special mask plates for unequal spacing made to order. 48 notch master index plate furnished with standard unit. Special master index plates for 27 through 54 divisions carried in stock. Special index plates for unequal

spacing made to order.



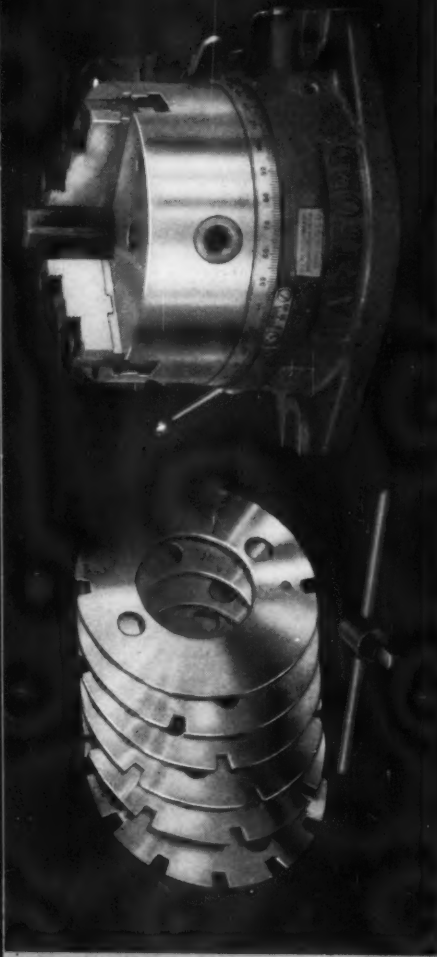


### 8" SUPER-SPACER

Length overall: 12 1/4"  
Width overall: 10 1/4"  
Base to chuck face: 6 3/4"  
Width of Keys: 1 1/2"  
Thru hole diameter: 1 1/2"  
Chuck capacity: 1/8" thru 8" O.D.  
Weight: 110 lbs.

Mask plates for divisions from 2 through 18 are available from stock. 2, 3, 4, 6, 8 and 12 notch plates are furnished with the standard unit. Special mask plates for unequal spacing made to order.

24 notch master index plate furnished with standard unit. Special master index plates for 16 through 36 divisions carried in stock. Special index plates for unequal spacing made to order.



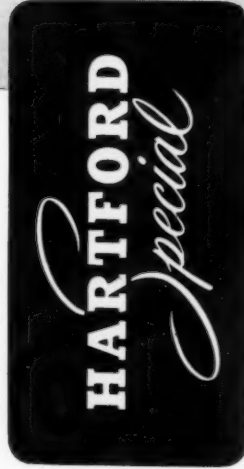
**Thousands of users the world over**

**proclaim Hartford Special Super-Spacer**

**The Standard of Indexing Devices for —**

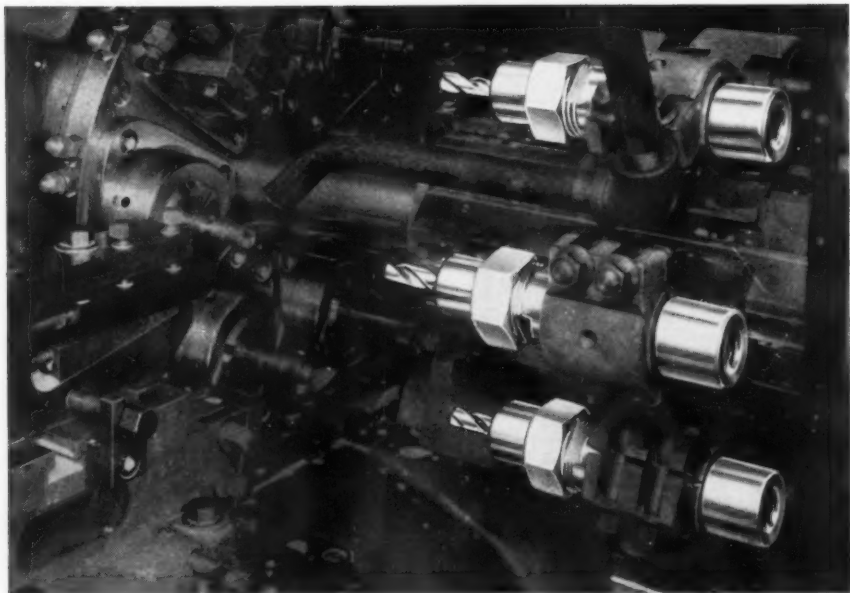
Milling	Boring	Inspecting
Drilling	Slotting	and other
Tapping	Planing	Machining Operations

A complete line of accessories available. See the Hartford representative in your area or write for Bulletin S-104.



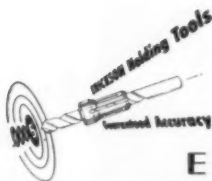
MACHINE TOOL ACCESSORIES DIVISION  
**THE HARTFORD SPECIAL MACHINERY CO.**  
26411 HOMESTEAD AVENUE HARTFORD 12, CONN.





Courtesy The National Acme Co.

*better holding tools  
give a tighter grip  
on production costs*



Wide experience with Erickson chucks explodes the *idea* that ordinary holding tools "will do" . . . emphasizes the *fact* that your production costs plummet with Erickson's superior holding power and accuracy.

That's why The National Acme Co. usually furnishes Erickson collet chucks. Because with Erickson you reduce set-up time . . . get faster feeds and speeds by "stubbing" tools. Guaranteed accuracy of .0005" and greater gripping power assure proper drill alignment . . . drills cut evenly on both lips . . . give more holes per grind.

So come to grips with your Number One Problem—high production costs. The first step is to get the Erickson story.

Send for Catalog K today; you'll find many interesting applications for all Erickson holding tools.



## ERICKSON TOOL COMPANY

2304-9 Hamilton Avenue • Cleveland 14, Ohio

COLLET CHUCKS • FLOATING HOLDERS • TAP CHUCKS • TAP HOLDERS • AIR-OPERATED CHUCKS  
EXPANDING MANDRELS • SPECIAL HOLDING FIXTURES AA-1548

Circle No. 239 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

## Why the Die Designer Prefers **PRODUCTO** Die Sets



### **He can specify Producto with complete confidence**

The die designer likes to specify Producto die sets on his blueprints because they are a nationally-accepted "brand." They're easy to get anywhere... and delivery is prompt.

He favors Producto because he knows he never has to compromise his die design. Even if the die layout is a little unusual, he will be able to select a die set to accommodate it from Producto's wide range of thicknesses and styles.

He also knows Producto has the equipment that can cut his tooling costs by letting him adapt his sets to a more economical *basic* design. Only Producto offers him complete foundry, pattern-making, welding and machining services for his special requirements.

The die designer recognizes Producto's Qwik-Fit Guide Pins as an important new feature that die makers want. He specifies them because they save up to 75% of the time normally required for die set assembly and disassembly.

The die designer likes to use Producto's new catalog, the industry's most practical tool. His die

layout is simplified when he uses Producto die set templates. And Producto provides him with cost-saving ideas in the DIE SET DIGEST.

Most important, he can depend on *consistent* Producto die set accuracy to transfer from the drawing board to the press the precision and ingenuity of his die design.

Yes, the designer has found that Producto die sets justify his confidence in specifying Producto. You will, too.

**TWO FREE AIDS** to more economical, efficient use of die sets are available from Producto. All-new CATALOG NO. 11 makes ordering and selection job easy. **DIE SET DIGEST** gives valuable tips for designers, builders and users of dies. Write for them today.



**THE PRODUCTO MACHINE COMPANY**  
960 Housatonic Ave., Bridgeport 1, Connecticut



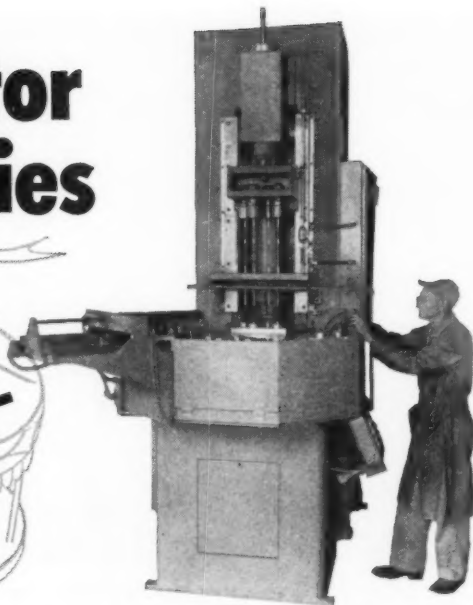
Wherever die sets are used

# **PRODUCTO**

PRODUCE MORE WITH PRODUCTO PRECISION DIE SETS

Circle No. 240 on Card, Opposite Page 65

# Distributor Assemblies ride



## on new Acme automated broaching machines

Automated hydraulic broaching machines, as illustrated, were designed and manufactured by Acme for broaching bores in distributor shaft and cam assemblies. . . . Each unit produces at the rate of 720 completed parts per hour. In production use machine cycles continuously, automatically broaching, gaging and ejecting finished parts. . . . Units are arranged with hydraulically operated rotary tables having eight index stations. Four stations are work stations and four stations are broach return stations. Each work station receives four work parts at a time. . . . After parts have been manually loaded, they progress to the broach station where four parts are broached. At next index, the broaches are returned upward through open bores in the work table and simultaneously the four parts just broached are gaged for size and straightness. After broaches are raised clear, table again indexes and during broach stroke four completed parts are automatically ejected by means of hydraulic slide shown.

*Write or wire for further information*

**ACME BROACH CORP.**  
MILAN, MICHIGAN

# \$1 BUYS ANY MACHINE

upon termination of 3 year Rental Plan

## OUTSTANDING NEW MACHINERY

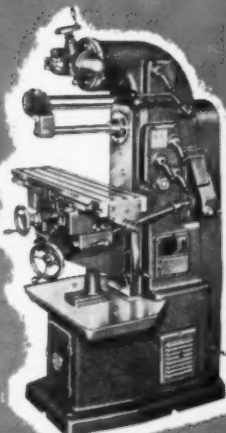
### at lower cost!

**LIBERAL  
TERMS**

## PEDERSEN MILLING MACHINES



**VPF-00 \$1,295.00**

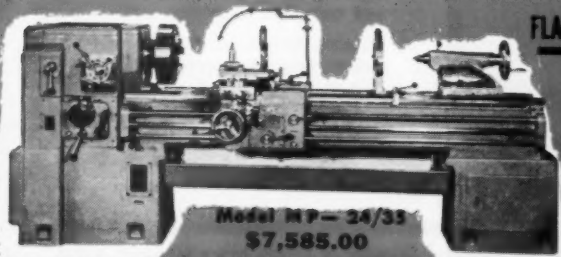


**VPF-00 \$1,895.00**



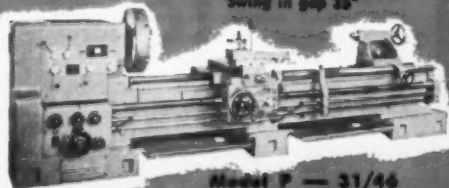
**PEDERSEN UNIVERSAL TOOL & CUTTER GRINDER, MODEL U.S.L.**  
Main spindle rated at 3,800 to 5,750 RPM.  
36 1/2" x 5 1/2" table working surface.

**\$2,695.00**



**Model MP-24/33**  
**\$7,585.00**

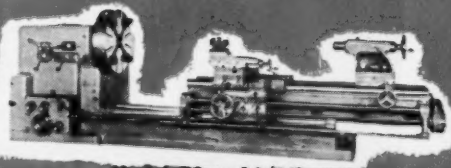
Swing over ways 24";  
Swing in gap 35"



**Model P-31/46**  
**\$8,890.00**

Swing over ways 31";  
Swing in gap 46"

Swing from 12"  
to 67" available



**Model PS-34/61**  
**\$11,990.00**

Swing over ways 34";  
Swing in gap 61"

**Sliding Bed  
Gap Lathe**

**FLAME HARDENED AND GROUND BED WAYS**

## IMPERIAL LATHES

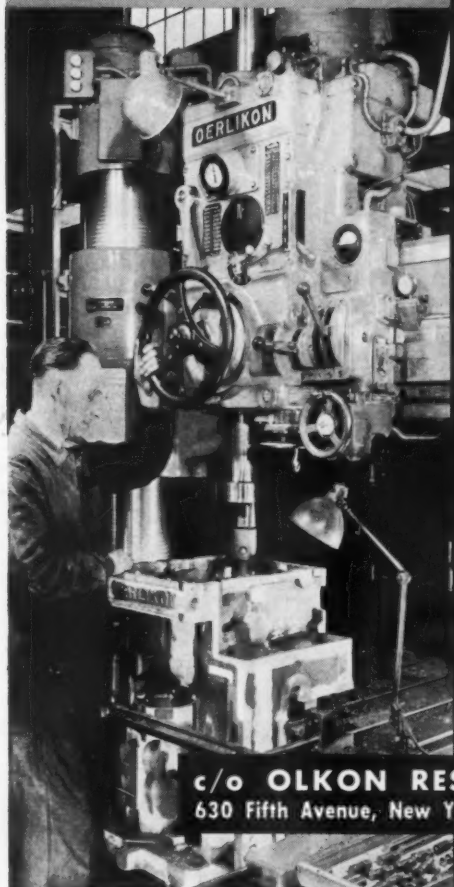
Precision spindles are hardened & ground, machined from chrome-nickel steel forgings. All gears and shafts are hardened and ground. Spindle noses are standard taper key-drive type.

# AARON MACHINERY CO., INC.

Dept. B 45 CROSBY ST. NEW YORK 12, N.Y. WA 5-8300

See Our Other Advertisement on Page No. 37

Branches at:  
Buffalo N.Y. Mineola N.Y.  
Los Angeles, Calif.



**Accuracy  
Economy  
Versatility in  
Precision Boring  
production  
jig borers**

The finest production and precision machines for drilling, boring, precision boring in coordinate location, reaming, tapping, threading, facing, turning, milling, on repetition, single piece and tool room work. Two measuring systems for coordinate location are available on each machine:

- 1° **Optical Reading** for single piece and tool room work.
- 2° **Spacing blocks and dial indicators**, favored for repetition production work.

Three sizes available—each handling a multitude of jobs, so sturdy they are suited not only for the tool room but also for direct jigless production.

Capable of taking heavy cuts with rapid handling... wide range of accessories solves every quantity as well as single piece production problems. Moderately priced.

Write for detailed information and prices to: Mr. Francois Perret

**c/o OLKON RESEARCH CORPORATION**  
630 Fifth Avenue, New York 20, N. Y. • Tel.: Circle 6-0453

(Some exclusive territories still available)

Circle No. 243 on Card, Opposite Page 65



# Working in the dark on TITANIUM MACHINING?

... THESE RECOMMENDED  
FEEDS AND SPEEDS FROM  
**ADAMAS** WILL HELP END  
YOUR DIFFICULTIES!

Now your problems in machining titanium can be considerably lessened with these valuable facts and figures tabulated from actual production runs by several of the East Coast's largest aircraft and engine producers.

Choice of ADAMAS carbide for these titanium jobs was determined through pre-testing against the grades of three other leading carbide producers. Against this stiff competition, ADAMAS outperformed all other grades by 4 or 5 to 1!

*If you're already machining titanium or planning to, be sure to specify —*

ADAMAS Grade BB for improved performance in heavy roughing and scale cuts.

ADAMAS Grade B, the ideal grade for general machining and semi-roughing.

ADAMAS Grade A for perfect finish turning and milling operations.

Since the proof of the carbide is in the cutting and not the advertising, don't read our claims—test them! Plan a test of ADAMAS grades for titanium today!

**TEST WITHOUT OBLIGATION!** For an actual machine test or detailed titanium machining literature, contact: Technical Service Div., ADAMAS Carbide Corp., 521 Kenilworth, N. J.

## ADAMAS RECOMMENDED FEEDS AND SPEEDS for machining TITANIUM ALLOYS\*

(For machining commercially pure titanium, type TI-75A, double speeds.)

	Scale Forgings	No scale semi- roughing	Finish turning, boring & facing	Milling
Grade of Carbide	ADAMAS Grade BB†	ADAMAS Grade B	ADAMAS Grade A	ADAMAS Grade A
SFPM	50	150-200	300	350
Feed	.010 - .020	.010 - .020	.005 - .010	.003 per tooth
Depth of Cut	250-500	250	.015 - .032	

### HELPFUL "TIPS"

#### How To Eliminate Vibration

To end tool vibration, use as large a shank size as possible on the tool. For severe roughing or scale cuts use a high lead angle. Another "tip" is to have a 45° land on the cutting edge approximately .005" to .010" wide . . . or reduce feed.

#### What To Do About Scale or Oxide

In machining titanium forgings covered with scale or oxide, use as large a radius as possible on your tool. This radius, however, must be kept below the point where vibration will be encountered.

\* These figures represent approximate starting points and should be adjusted to your own machines and set up conditions.

† Figures on ADAMAS Grade BB represent a rough face front flange operation of 682 Titanium Alloy on a Bullard VTL machine. The size of the material was:

Diameter—1 7/8"

Length of cut—5"

ADAMAS Grade BB delivered 12-15 pieces per grind. Figures on Grades A & B available upon request.



# ADAMAS

**CARBIDE CORPORATION**

KENILWORTH, NEW JERSEY

Producers of tungsten carbide tools, tool tips,  
dies, screw parts, Dex-A-Tool and Cernlox.

# NEW—from

# W T

ALKER-TURNER

The finest precision grinders ever built—the new Walker-Turner “Light-Heavyweights”. Designed to do the most exacting grinding operations *quickly and economically*, and save you time and money. Low initial cost, positive accuracy, and advanced safety

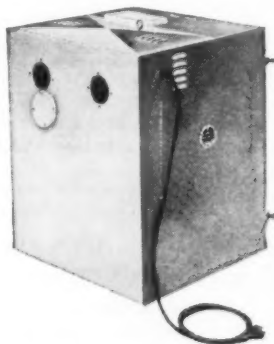
features make Walker-Turner Grinders ideal for your plant.

Ask your Walker-Turner distributor to demonstrate the superior advantages of these versatile grinders and other famous Walker-Turner tools. Mail the coupon below for complete information.



NEW WALKER-TURNER  
6" CARBIDE TOOL GRINDER

... keeps your carbide-tipped cutting tools at peak efficiency. Vibration-free operation assures true grinding. Tables tilt to permit wet or dry grinding at any angle.



NEW WALKER-TURNER  
DUST COLLECTOR

... has strong, pressed steel cabinet, removable filter, enclosed  $\frac{1}{2}$  H.P. motor and fan that moves 350 cubic feet of air per minute. Unit is compact and portable.



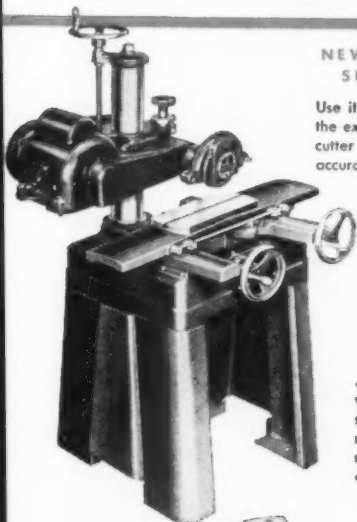
A complete line of "Light-Heavyweight"

# GRINDERS

to bring you New production economies

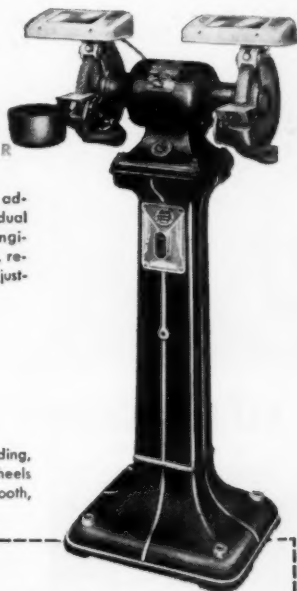
## NEW WALKER-TURNER SURFACE GRINDER

Use it as a big capacity grinder that offers you the extra ability to do chip-breaker and tool and cutter grinding. You get simple set-up, precision accuracy, AND surprisingly low cost.



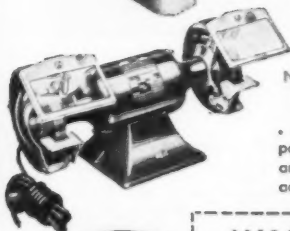
## NEW WALKER-TURNER 7" TOOL GRINDER

... combines positive accuracy with advanced safety features. You get dual shatterproof-glass eye shields, engineered wheel guards, dust chutes, removable steel side plates, and adjustable spark deflectors.



## NEW WALKER-TURNER 6" BENCH GRINDER

... takes up minimum space for grinding, polishing and buffing. Balanced grinding wheels and precision ground shaft provide smooth, accurate performance.



## WALKER-TURNER

Division of Rockwell Manufacturing Co.,  
Dept. WL-23 400 North Lexington Ave., Pittsburgh 8, Pa.

- ☐ Please send name of my Walker-Turner distributor.  
☐ Please send literature on Walker-Turner Grinders.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

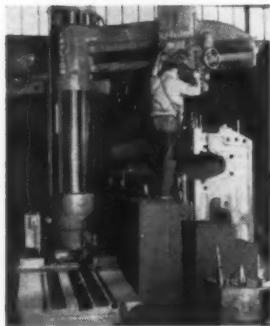


# Carlton

horizontal and radial drills



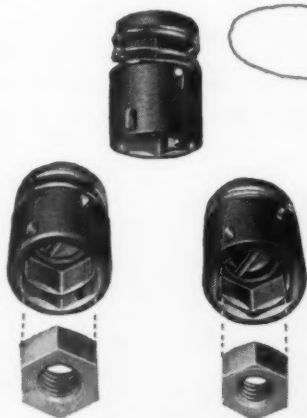
## K&T likes Carlton's hole drilling mobility and accuracy



This Carlton radial drill really "gets around" at Kearney & Trecker Corp., Milwaukee. A special sliding bed plate brings Carlton's hole drilling efficiency to bear over the entire length of this enormous 23-foot long K&T milling machine base. It drills 216 holes at one setting without the necessity of lifting so much as an ounce of its 12 tons. Think what this special Carlton mounting means in time, energy and money saved!

And this ingenious mobility means even more when you add to it the many other advantages of Carlton radial drills: low-hung drive, super-precision column clamp, 3-unit power clamping, positive tooth feed clutch and easy, economical maintenance. Arm lengths from 3 feet to 12 feet, column diameters from 9" to 26". Send today for descriptive bulletin. The Carlton Machine Tool Co., Cincinnati 25, Ohio.

Circle No. 246 on Card, Opposite Page 65



This Apex "2-in-1" spring-loaded impact socket is used interchangeably to run down  $\frac{3}{4}$ " and  $\frac{7}{8}$ " hex nuts on automobile engines. It eliminates constant changing of tools, helps step up production.



This Apex Spanner-type socket has four internal driving lugs to engage the four openings in the flange-type nut. It eliminates the customary external prongs that frequently break off and slow down assembly operations.



The true cost of any tool will show up in production records, not just on the price tag. The amount of work a tool can do efficiently is far more important than the original tool cost.

For example, each of these special Apex sockets was designed to solve an unusual fastening problem. For this reason alone, these tools have proved well worth their original price. In addition, these tools have provided substantial savings in production time and expense—that's why the true cost of Apex tools is always lower.

Apex—the authority on fastening—offers creative engineering and specialized manufacturing experience that will help solve your fastening problem. Our new Pocket Catalog is ready—may we send you a copy?

Ask

**APEX**

*for the answer to your fastening problem!*

**THE APEX MACHINE & TOOL COMPANY**

1028 S. Patterson Blvd. • Dayton 2, Ohio

THE

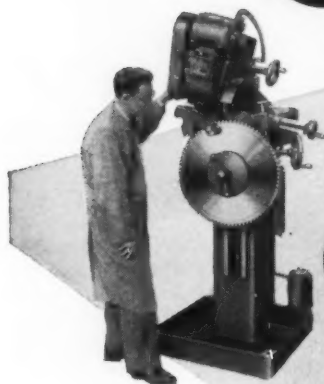


IS A

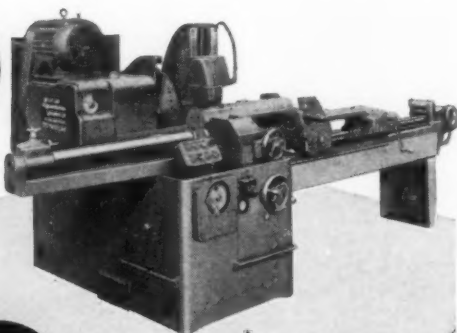
# Triple-threat

TO HIGH CUTTING COSTS

CIRCULAR  
SAWING  
MACHINES



SAW  
BLADE  
SHARPENERS



The No. 2-8 machine for cutting off solid metal up to 8' square.

The G-45 sharpener for blades 8' through 48' diameter.

SAW  
BLADES



M. & M. saw blades cut any machinable metal. Cut-off blades: segmental — 11" through 120" diameter; solid — 8' through 20' diameter. Slitting saws — 3" through 8" diameter.

You may profit immensely by applying the M. & M. Triple Threat to your cut-off costs. Machine, blade, and grinder, made by the first company to build all 3, often effect phenomenal savings, as proved by detailed case studies. *Just such a study of your job is yours for the asking.* We offer you an unmatched experience in the sawing of any machinable metal, round, square or structural shapes, from 1/4" through 43" diameter.

## THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION  
CLEVELAND 13, OHIO

Builders also of Production Milling, Vertical Turning, Automatic and Special Machines

Circle No. 248 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

the  
secret  
is out!

## It's the steel in **ACE** drill bushings!

### **TWO YEAR SECRET STEEL FORMULA ASSURES LONGER DRILL BUSHING LIFE...**

If you are one of the many ACE drill bushing users who have told us about the extra-long bushing life you have been getting from our drill bushings—we thank you...and now we are going to tell you why!

More than two years ago ACE, without telling anyone and without raising costs, began making shipments of drill bushings made of a special high-carbon chromium bearing steel! With this new oil-hardening steel coupled with an exceptionally high degree of precision in the heat treat-

ing process, ACE engineers found that bushing life was increased tremendously. Rather than make an announcement at that time...we hoped that user comments would prove the importance of the new steel—and they certainly have! From all parts of the nation ACE drill bushing users have told us about the much longer life they have been getting...how production costs from both a material and labor standpoint have dropped sharply. Now...the secret is out...it's the steel!

**Look to ACE for Quality...Accuracy...  
Largest Deliverable Stocks Anywhere!**

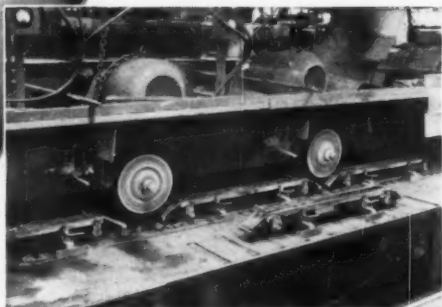
Write TODAY for the all-new  
1956 catalog containing technical  
data, comparison tables,  
price lists and name of dealer  
in your area.



**ACE DRILL BUSHING CO., INC.**  
5407 Fountain Ave., Los Angeles 29, Calif.

BEFORE  
BRUSHING

AFTER  
BRUSHING  
(prior to plating)



*A leading manufacturer uses 16" diameter Osborn Fascata Brushes, operating at 1700 rpm, to finish automotive trim parts prior to plating.*

## Smooth start for a perfect finish

THE bright smoothness of metallic trim—adding a final touch of beauty to thousands of products—must start with an equally smooth surface prior to plating.

Makers and users of trim parts find Osborn power brushing methods ideal for removing draw marks, blending imperfections into an unmarred plating surface, materially reducing rejects.

An Osborn Brushing Analysis, made in your plant and at no obligation, will point out the many ways Osborn power brushing can improve your metal finishing operations. Write *The Osborn Manufacturing Company*, 5401 Hamilton Avenue, Cleveland 14, Ohio.



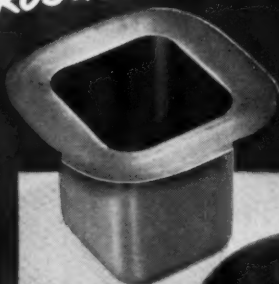
BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES • BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

Osborn Brushes 

Circle No. 250 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

**NO GALLING  
NO PICKUP  
MULTIPLIED PRODUCTION RUNS**



**OTTAWA 60**

for DRAW DIES is ***PRODUCTION NEWS!***



Write for a copy of the  
**OTTAWA 60 BLUE SHEET**

This Blue Sheet contains certified data on the physical characteristics of Ottawa 60, prepared from carefully checked laboratory and field service tests. All the information you'll need on methods of handling and heat treatment, etc.

**ADDRESS DEPT. MB-93**

In fact, this exclusive Allegheny Ludlum-developed die steel is mighty *good news* for any user of draw dies. Ottawa 60 is a high-carbon, high-vanadium analysis, initially designed for the primary purpose of drawing stainless steel.

In that service, Ottawa 60 does just exactly what it was developed to do: it performs without galling or pickup, and shows exceptional wear-resistance—as a long list of successful applications will prove to you. Two of them are illustrated above: a stainless hinge and a stainless sundae server.

But Ottawa 60 is a top performer on any draw die application! Also illustrated above are the two draws on a transformer housing of .037" gauge SAE 1010 strip. After more than 25,000 pieces—over 12 times any previous runs—there was still no sign of pickup, or of wear on the Ottawa 60 punch or die.

This analysis can solve your draw-die problem jobs—or reduce your costs on almost any drawing operation. • Call on our Mill Service Staff for any assistance. Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.

For complete **MODERN** Tooling, call  
**Allegheny Ludlum**



Circle No. 251 on Card, Opposite Page 65



# NEW

## INFORMATIVE DATA on STRIPPABLE PROTECTIVE COATINGS



Positive protection against rust, abrasion, corrosion  
for all metal parts and tools



Send for your copy now!

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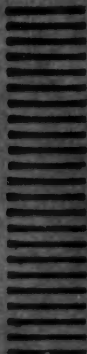
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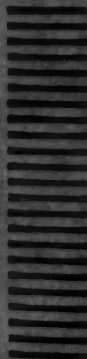
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to the science of tapping explained  
in simple terms.

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refresher and reference.

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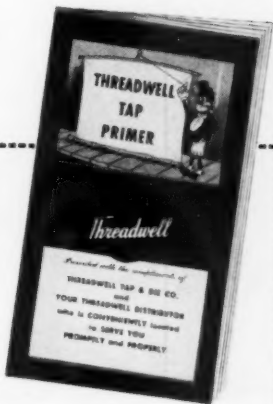
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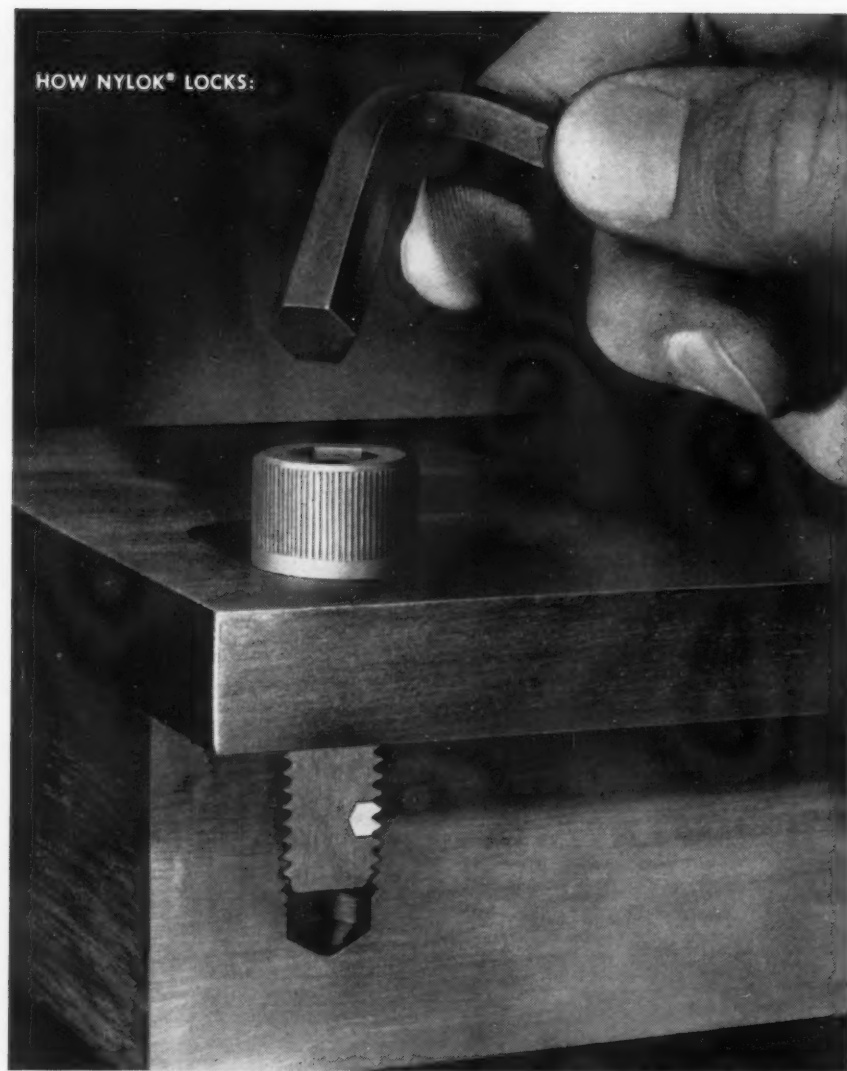
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Circle No. 265 on Card, Opposite Page 65

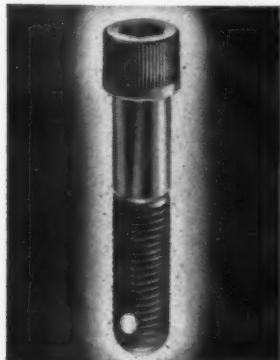
# NEW—self-locking UNBRAKO



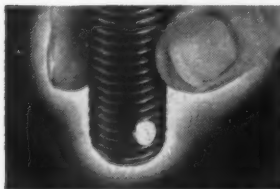
**LOCKED!** The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together and locks the screw securely.

# socket head cap screws

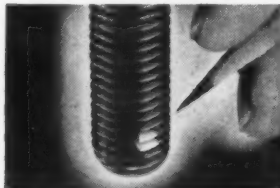
They won't work loose. And they simplify design and save production time.



Self-Locking UNBRAKO socket head cap screw.



**BEFORE ASSEMBLY.** The nylon pellet projects slightly. When assembled, threads will be impressed into it.



**AFTER REMOVAL.** "Plastic memory" of pellet has expanded impressed threads to greater diameter than screw threads. Screw can be used repeatedly. In use, "memory" keeps threads tightly locked.

UNBRAKO socket head cap screws are now available embodying the Nylok\* self-locking principle. Nylok provides the first truly practical solution to the problem of making cap screws self-locking.

An UNBRAKO cap screw with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Just thread the UNBRAKO into any tapped hole. *Seated or not*, it locks positively wherever wrenching stops. The tough, resilient nylon pellet forces mating threads together and holds tight. The screw will not work loose.

You save production time when you make products with self-locking UNBRAKOS. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly wiring of cross drilled heads is eliminated. And in many cases you will save weight and mass by using shorter screws in tapped holes instead of drilling through and using nuts and lockwashers.

Self-locking UNBRAKOS are reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from  $-70^{\circ}$  to  $250^{\circ}\text{F}$ . And, when screws are properly seated, the locking pellet also functions as a liquid seal.

A complete line of self-locking UNBRAKO socket screw products, in a wide range of standard sizes, materials and finishes, is available through your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 52, Pa.

\* T.M. Reg. U.S. Pat. Off. The Nylok Corporation

## UNBRAKO SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.

**SPS**

JENKINTOWN PENNSYLVANIA

Circle No. 266 on Card, Opposite Page 65



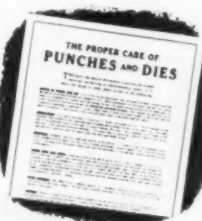
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For your convenience we carry 400 sizes of our 21 standard punches and matching dies in stock. Punching diameters range from  $\frac{5}{32}$ " to  $1\frac{1}{2}$ ". You will get prompt shipment of any standard punch. Special sizes or shapes will be made to your specifications.

Don't overlook the savings offered by the Cleveland system of standardization. You can punch any size hole from  $\frac{1}{8}$ " to  $1\frac{1}{16}$ " by using the same coupling nut and punch stem.

*Are you obtaining maximum service from your Punches and Dies? Protect tool life—send for copies of our two-color wall instruction chart, "Proper Care of Punches and Dies."*

A-5169



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PUNCH & SHEAR WORKS CO.  
U.S.A.

Established 1880

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**PUNCHING TOOLS & DIES**

OFFICES AT:  
NEW YORK CHICAGO  
DETROIT PHILADELPHIA  
& LANSING

**FABRICATING TOOLS**

CLEVELAND 14, OHIO

Circle No. 267 on Card, Opposite Page 65



# Logan

- 12" SWING
- 1" COLLET CAPACITY
- 1 1/4" SPINDLE BORE
- 23" and 35" CENTERS
- VARIABLE SPEED OR DOUBLE V-BELT DRIVE

## ACCURACY, CAPACITY AND POWER COMBINED IN THIS 12" LATHE

This 12" swing lathe typifies Logan advanced design and rugged construction. Gears are extra wide and strong. Shafts are extra heavy. The lead screw has a full 7/8" diameter.

The precision carriage rides on a two-V-way, two-flat-way bed that is rugged, precision ground and warp-free. The heavy spindle turns on oversize ball bearings, no bearing adjustment needed for any speed between 38 and 1575 rpm.

This lathe, and every Logan Lathe from 14" swing down to 9" swing, is dynamically balanced before it is shipped. The result is *sustained accuracy* and smooth, quiet power on every lathe turning operation. See your Logan Lathe dealer for more facts—or mail us the coupon below.



No. 2557-V  
12" Swing,  
Variable Speed Drive  
35" Centers

**THIS COUPON**  
will bring you full details  
on Logan Lathe construction  
and specifications.

### LOGAN ENGINEERING CO.

4901 West Lawrence Avenue, Chicago 30, Ill.

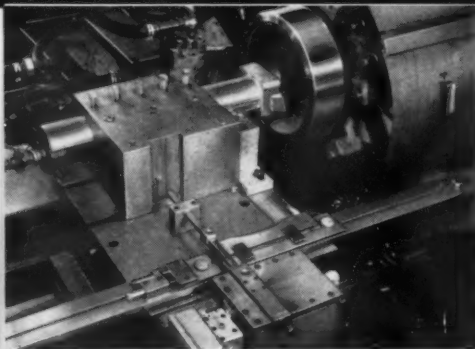
Send me full facts on the Logan line.

Name.....

Company.....

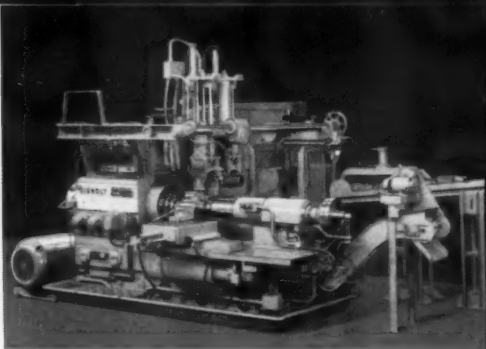
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**NO. 24—WITH CHUCK**

Ninety pounds of tough bearing steel are removed in two 8-minute operations on this job. One No. 24 handles six types and 24 different sizes of inner and outer bearing races with ease and efficiency. A JETracer on the rear independent slide simplifies spherical, straight and taper boring operations—also improves accuracy and finish and lowers unit costs.



**NO. 24—ON TAILSTOCK-SUPPORTED EXPANDING ARBOR**

Automatic loading and unloading are part of the machining cycle on this setup. Utilizing overhead clamps and a traversing carriage arrangement, the No. 24 makes fast work of these tough steel tool joint forgings. The operator has separate push-button control over all machine and handling functions for faster, easier setups and change-overs.

## YOU CAN REDUCE COSTS ON NEW GISHOLT MASTERLINE NO. 24

WHETHER YOUR LARGE PART PRODUCTION INVOLVES long, steady runs or small repeat lots, you'll find definite ways to cut costs with this new Gisholt MASTERLINE No. 24 Automatic Production Lathe.

And you can realize these savings whether your work has to be held on an arbor, in a chuck or special fixture, or between-centers with work driver and tailstock—for the big No. 24 will handle parts all four ways.

Cost cutting with this extra powerful (up to 125 h.p.) single-spindle automatic is inherent within its standard automatic cycle. Hydraulic control of all carriage and auxiliary slide movements—plus automatic stopping and starting of the spindle—lets one operator handle two or more of these machines, or perform other jobs during machining time.

Still more savings are realized through faster, easier setup and shorter change-over periods. During setup, all hydraulic actuated movements may be manually controlled. Spindle speeds, feeds and stops are easily changed. This means you can produce a variety of large parts—or handle small repeats—without excessive down time between sizes or jobs.

Whatever type of large part you are producing now—or planning for the future—your Gisholt Representative can show you how and where the No. 24 will produce it for less cost. Call him today—or write Gisholt for complete information.

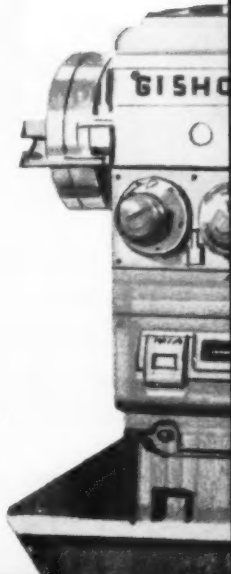


GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

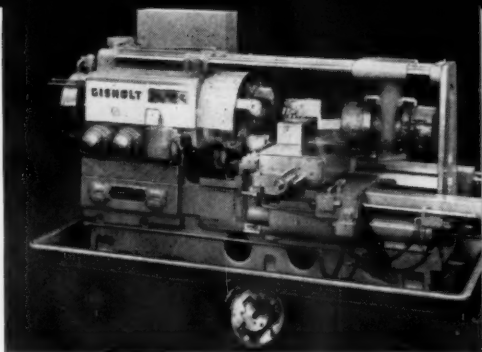
TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS





**NO. 24—WITH CHUCK AND TAILSTOCK SUPPORT**

With this setup, husky airplane drive gear and propeller shafts are completed in two fast operations on two No. 24's. One man handles both machines. The first operation is shown. Five diameters are machined plus turning, facing and chamfering. The second operation, on the other end, is similar. Floor-to-floor time: 12 min. per operation with 75 lb. of metal removed.



**NO. 24—WITH CHUCK AND LOADING ARBOR**

Here, standard tooling plus a unique, indexing-loading arbor arrangement on the No. 24 has cut costs and reduced effort in the machining of heavy cast iron diesel cylinder heads. Floor-to-floor time is only 1.2 minutes. More time is spent making chips because most of the loading-unloading operation is performed while the tools are working on the next part.

## LARGE PART PRODUCTION WITH THE AUTOMATIC PRODUCTION LATHE

Circle No. 269 on Card, Opposite Page 65





# **NOW, Small Kendex® Button Tools with turnover "throw-away" inserts**

Kendex Holders in the small size (illustrated) have  $\frac{1}{2}$ " square by  $4\frac{1}{2}$ " long shanks. They take  $\frac{3}{8}$ " square or  $\frac{1}{4}$ " (inscribed circle) triangular inserts.

***...for light machining on high production operations... especially useful for boring operations***

Another variation of the popular Kendex Tooling is now available. This is the new  $\frac{1}{2}$ " Kendex Holder, available in four styles, for use with triangular or square Kennametal\* "turn-over" button inserts . . . making available small tools with the many advantages and economies of the Kendex principle:

- grinding is eliminated.
- inserts are indexed quickly to each new cutting edge.
- machine downtime is reduced to a minimum.
- production is increased.

Small-sized Kendex Tools are equipped with Kennametal chip breakers and solid Kennametal seats to back up inserts.

Kennametal inserts for small Kendex holders are stocked in a number of grades including the new K7H grade for high velocity operations and for machining heat-treated or high tensile steels.

Tell us your small-tool problem and our tool engineers will help you select the right tool and grade of cutting edge.

If you are interested in small-sized, rugged, dependable clamped-type tooling, ask your Kennametal tool engineer to show you how these small Kendex holders can be used to advantage on your operations. Or write for Booklet 301. KENNAMETAL INC., Latrobe, Pa.

\*Registered trademark

B-5978A



**INDUSTRY AND  
KENNAMETAL**  
*...Partners in Progress*

Circle No. 270 on Card, Opposite Page 65

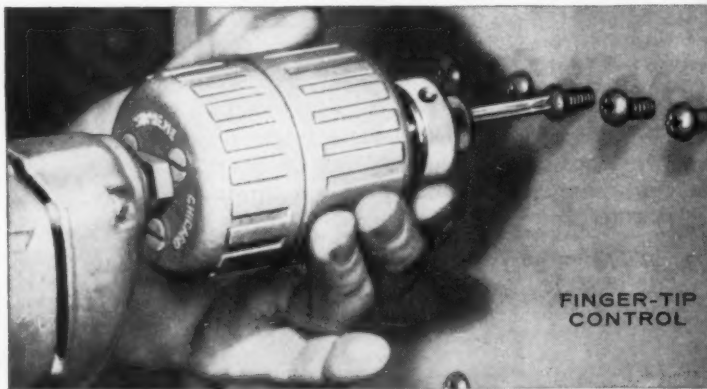
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maintenance and production**

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**REVERSIBLE**  
SPEED REDUCER

Fits all portable drills . . . re-  
duces speed, increases torque  
seven times. Ask your dis-  
tributors to show you the . . .

*Supreme* **Versamatic**

PROFESSIONAL MODEL  
No. 4000-P  
WITH YANKEE-TYPE BIT HOLDER



COMPLETE 14-PIECE SET . . . ONLY **\$24.95**

Engineered and manufactured by the makers of

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BRAND

UP FRONT on America's leading power tools

**SUPREME PRODUCTS CORP.** 2222 S. CALUMET, CHICAGO, ILLINOIS

Circle No. 271 on Card, Opposite Page 65



DRIVES SCREWS



REMOVES SCREWS



RUNS NUTS, BOLTS



ON OR OFF



SPEED REDUCTION



FOR DRILLING



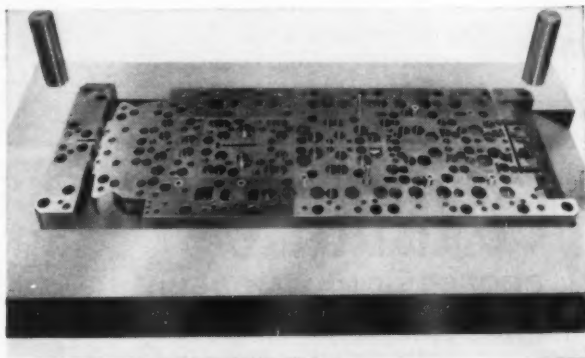
DRIVES TAPS



REVERSE  
removes taps  
by power

# Holes **JIG GROUND** with *Vulcanaire*

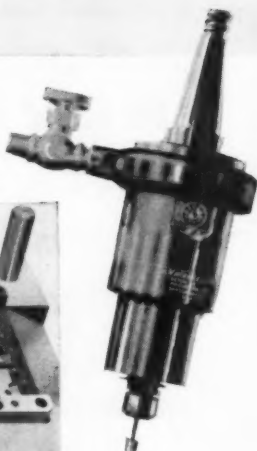
Provide yourself with this inexpensive\* instrument for use on your present equipment and JIG GRIND with a guarantee.



A seven station die from Vulcan's contract Tool Room  
(Your Tool Room in Dayton).

Standard sized punches and buttons were used. But since forming and piercing operations were involved, hardening of the sections was necessary followed by JIG GRINDING. Result: Close tolerances held easily and perfect progression throughout — another satisfied customer.

\*Vulcanaire equipment pays for itself on the first job.



Vulcan's  
45th year.

Borrow  
Vulcan's  
instructive  
movie on  
jig grinding.

## Services of **YOUR TOOL ROOM** in Dayton

Engineering, Processing, Designing . . . Special Tools . . . Dies . . .  
Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . .  
including the Vulcan Hydraulics that Form, Pierce, Assemble and Size . . .  
Vulcanaire Grinding Heads . . . Motorized Rotary Tables . . . Plastic Tooling . . . Vulcanaire Jig Grinders.

**VULCAN TOOL CO.** 710 HIGHLAND AVE. **DAYTON 10, OHIO**

Circle No. 272 on Card, Opposite Page 65



## Make any type spring, without arbors, **FAST** with Perkins Spring Coiler!

When you need a replacement or experimental spring, any shape, diameter or pitch from flat or round wire sizes .005" to .125", you can produce it in a matter of seconds with the new Perkins Precision Spring Coiler! You entirely eliminate the use of arbors, yet turn out precision springs — torsion, compression, extension tapered, or special springs — coiled either left or right hand, in any desired length, any diameter from  $\frac{1}{16}$ " to 12" and larger, with or without initial tension, and with open or closed ends. Eliminate expensive special orders and costly production delays! Make your own springs to exact specifications for replacements or experimental work. Make them fast right in your own shop!



Power model  
for continuous  
runs, on welded  
steel console base

Only 7" high,  
OMNI-VISE is lowest  
in the trade.



## Hold any machine work at any **EXACT** angle with sturdy **OMNI-VISE**!

Accurately set in all three planes in only 15 seconds, this sturdy precision vise made in two capacities saves time and headaches for progressive shop operators and pays for itself quickly. Only 7" high (lowest in the trade), **OMNI-VISE** #4, shown at top, is tough, weighs 74 lbs. Jaws are 4" x  $1\frac{1}{2}$ ", open to 4". Base is 9" in diameter with one side straight. Inset shows **OMNI-VISE** #2, a precision low-priced vise. Users find it exceptional for grinding compound angles on carbide tools. Weight, 16 lbs. Height,  $4\frac{3}{4}$ ". Jaws,  $2\frac{1}{8}$ ". Opening,  $2\frac{1}{8}$ ". Base,  $7\frac{1}{4}$ " x 5". For grinding, drilling or general work at any angle, by hand or machine, an **OMNI-VISE** is the machinist's choice.



**EXCLUSIVE DISTRIBUTORS OF  
PRECISION MACHINE  
TOOLS**

**Connors and Davis  
Sales Corporation**

**CIRCUIT AVENUE,  
WEST SPRINGFIELD, MASS.**

Circle No. 273 on Card, Opposite Page 65

CONNORS AND DAVIS Sales Corp.  
609A Circuit Ave., West Springfield, Mass.  
Please send detailed information and prices on:

**PERKINS SPRING COILER**

OMNI-VISE #4 ☐ hand ☐ power ☐ #2 ☐

Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_ State \_\_\_\_\_  
City \_\_\_\_\_





*It's New! It's Different!*

the Burns Style

# TAPER LOCK PUSHER

(NOW Featured by Allen)

*No Friction*

*No Scratch*

*No Wear*



Pat.  
Pending

**GET  
DETAILS  
NOW**

## Many other important features

Burns style Pushers wear in; practically no wear-out. The taper lock principle enables the gripping surface to expand and contract automatically within a different range which fits both hot rolled stock and cold finished stock without change of pusher. . . . The pusher locks positively in forward direction and opens freely in opposite direction. . . . No friction or scratch on return of pusher. Bar cannot bounce back from the stock stop. Eliminates short pieces that waste material and machine time. . . . Taper lock holds regardless of length. . . . Bars up to 20 feet and longer used with ease and without strain. . . . The automatic adjustment of the taper lock increases the pusher life many times over that of the ordinary pusher.

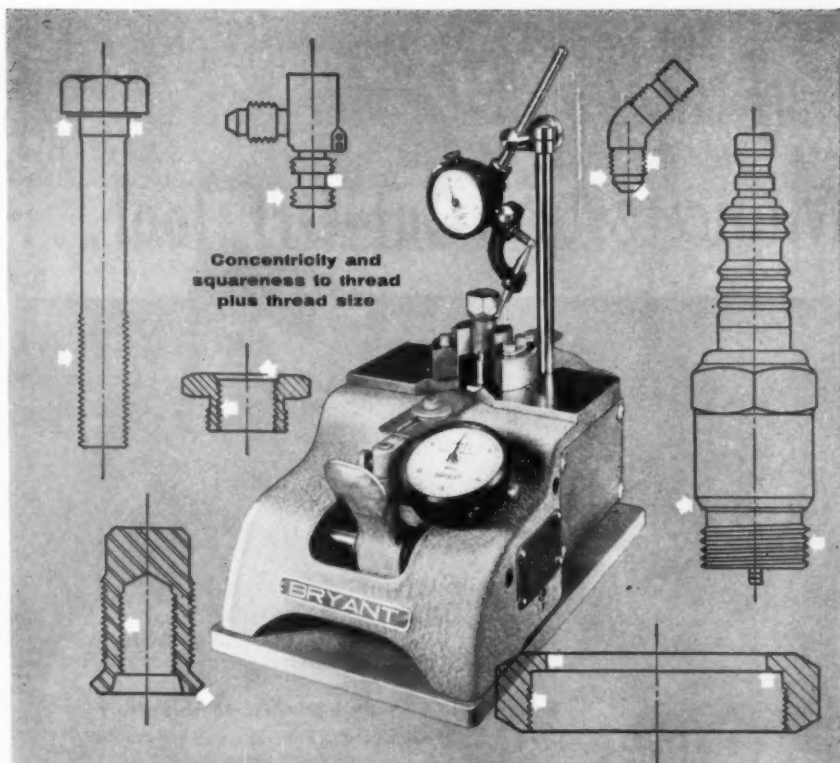
**will pay for themselves in 3-weeks time  
through tangible savings of money**

Desirable territories open for representation, inquire now

**ALLEN COLLET MFG. CO., INC.**

17720 CLARANN AVE. • MELVINDALE, MICHIGAN

Circle No. 274 on Card, Opposite Page 65



## You can check all these with a Bryant Gagel

These are just a few of the checking problems that Bryant  
Gages can solve — accurately and quickly. For a prompt solution  
to your checking problem, mail the coupon below.

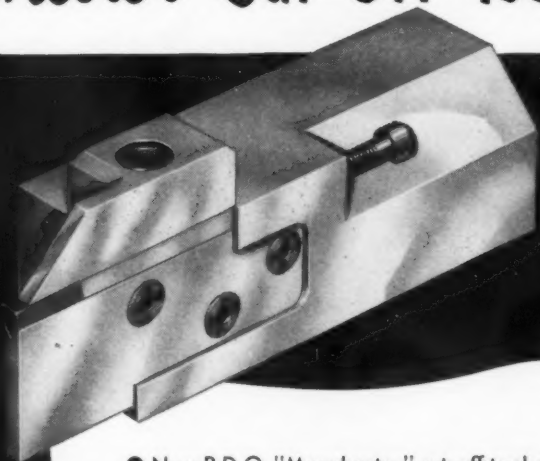
**Bryant Gage and Spindle Division    P. O. Box 620-E    Springfield, Vermont, U. S. A.**

Gentlemen: ☐ I am enclosing a print of my part. Please send me a quotation. ☐ Please send literature and prices on the complete line of Bryant Gages. ☐ Please have Bryant representative call.

Name \_\_\_\_\_ Street \_\_\_\_\_  
Title \_\_\_\_\_ City \_\_\_\_\_ Zone \_\_\_\_\_  
Firm \_\_\_\_\_ State \_\_\_\_\_

# Quick-Change . . .

## Manchester Cut-Off Tool . . .



● New P.D.Q. "Manchester" cut-off tool offers 15 SECOND tool change. Loosen only one screw to change carbide insert. "V" design on support blade and insert makes this tool self-centering and highly accurate. Adjustable rear stop provides positive insert backing and quick adjustment after insert is re-ground.

Tools are available for turret lathes, engine lathes, automatics and cut-off machines... Write for literature and specifications covering ALL the new "Manchester" tool features.



### PORTAGE Double-Quick TOOL CO.

1037 SWEITZER AVENUE • AKRON 11, OHIO

## FEATURES THIS MONTH

MACHINE AND TOOL

blue book

**A training program can pay off!** An interview with W. E. Bahl, vice president in charge of manufacturing, National Cash Register Co., reveals that NCR has a training program going on all the time. An offshoot of this program is their system for work simplification which has brought excellent results in cutting costs and promoting efficiency.

Page 99

**A round-up of Washington news** highlights the following features: The status of the Hoover proposals; how organized labor is girding for more benefits to Federal employees preliminary to their pitch to industry for the same benefits; the October-December period outlook for business; the increase in apprentice employment.

Page 83

**Five basic methods for successful setting of 90 degree bends in sheet metal** are outlined by Allan Young, tool design engineer of Collins Radio Co. The problem of producing an accurate angle between the two surfaces of steel for the full length of the bend is stressed by the author.

Page 105

**Is the high cost of regrinding or sharpening carbide tipped single point and insert type tools** a problem in your plant? Discharge machining can save you money if you sharpen a large enough quantity every day. By substituting brass for diamond wheels you can cut regrinding costs 65%.

Page 110

**The News of Automation Section** features some highlights of the International Harvester Company's Technical Conference held at the I. H. laboratories in Chicago. A summary of the machine tools displayed and demonstrated is presented along with

the high points of talks made by I. H. and other technical personnel.

Page 117

**Cold heading versus screw machine production.** A case history of one company's experience with both of these methods of producing worm screws, assembly eyelets and terminal rivets points out the case for screw machine production.

Page 170

**How did a board of Arbitration judge on these labor problems?** Three employees were discharged because one did not want a promotion; one refused to do a certain job; one was forced to defend himself in a fist fight on company property.

Page 136

**To solve the problem of finishing O.D. surfaces** of 14" diameter cast steel rings, an indicating fixture was used. Chuck jaws are adjusted to fit snugly against the I.D. of the work until each dial indicator registers "zero." by H. J. Gerber.

Page 125

**Seam welded tubing produced in a continuous mill** for each side rail of the new Chevrolet passenger car frame presented a problem when cut by a flying cut-off saw. Burrs around part of the inner diameter resulted. How Chevrolet solved the problem by making the severing cut in a press is described by Herbert Chase.

Page 164



*Speed up the job with*

# **ROTOR ASSEMBLY TOOLS**

**LIGHT... POWERFUL**

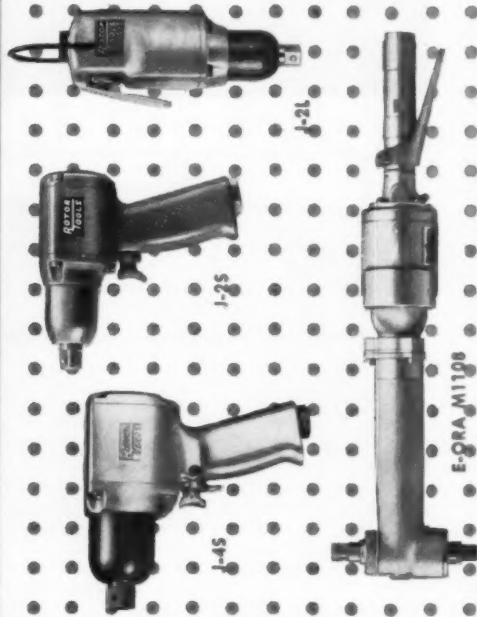
a type and size  
to suit your needs

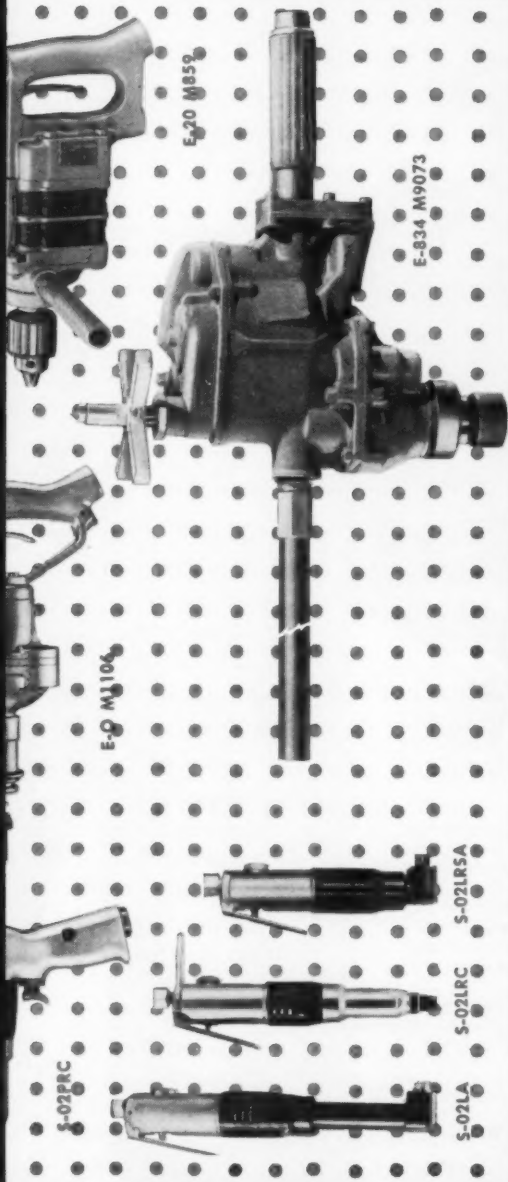
**AIR-POWERED**

**REVERSIBLE**

**NON-REVERSIBLE**

SCREWDRIVERS • NUTSETTERS  
IMPACT WRENCHES • DRILLS





- Write for Bulletin 53 giving specifications on these assembly tools and on the complete line of Rotor Tools for all industry. The ROTOR TOOL Company, Cleveland 32, Ohio.

## UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS

Circle No. 277 on Card, Opposite Page 65

# ROTOR TOOLS®

CLEVELAND, OHIO





# B-RIGHT-ON<sup>®</sup>

## SOCKET SCREW PRODUCTS

*always measure up!*



Socket screw users who want *what* they want *when* they want it know it pays to specify B-RIGHT-ON! Brighton Socket Screw Products *always* measure up.

Standard or special, Brighton Screws must meet and pass factory standards that are higher even than those specified by the ultimate user of the screws. Rigid control, from initial steel selection to final packaging, certifies every screw as B-RIGHT-ON quality.

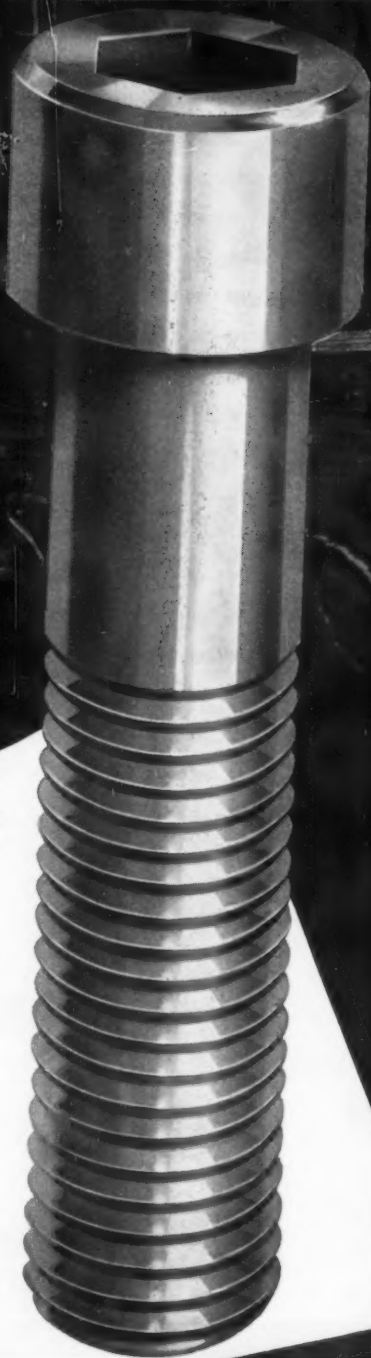
Selected mill supply houses, Brighton distributors, complete the control chain, assure the user of service and delivery as dependable as the screws . . . B-RIGHT-ON service.

Write for descriptive literature . . . see how

**YOU CAN DO BETTER WITH  
B-RIGHT-ON.**

**THE BRIGHTON SCREW  
& MANUFACTURING CO.**

1839 READING RD., CINCINNATI 2, O.





## ROUND-UP OF WASHINGTON NEWS

MACHINE AND TOOL

blue book

**Wholesale Price Index.** The latest BLS wholesale price index advanced 0.3% in the eighth consecutive week of steady to rising prices. It is at the highest price level in 63 months—1.2% under all-time high of Feb.-March '51. Since the last week in July, the BLS wholesale index has moved up 0.9%, BLS raw materials index 3.7% and Moody's scrap and waste materials index 5.4%. The Suez crisis will put significant additional pressure on prices, already moving into the second round of this year's inflationary movement.

### Status of Hoover Proposals

The Citizens Committee for the Hoover Report estimates that the recommendations already put into effect should save the taxpayers about \$532,000 annually.

An unofficial compilation of action to date to implement the bipartisan Hoover Commission recommendations indicates that steps have been taken to put into effect, in whole or in part, 112 specific proposals. The Commission originally made 314 recommendations for federal reorganization and more efficient government at less cost.

About half the Hoover recommendations require legislation; the other half administrative action only. Former President Hoover has estimated that adoption of the entire program would make possible savings over \$5.5 billion annually.

This would mean a 15 per cent tax cut if applied entirely to personal income taxes.

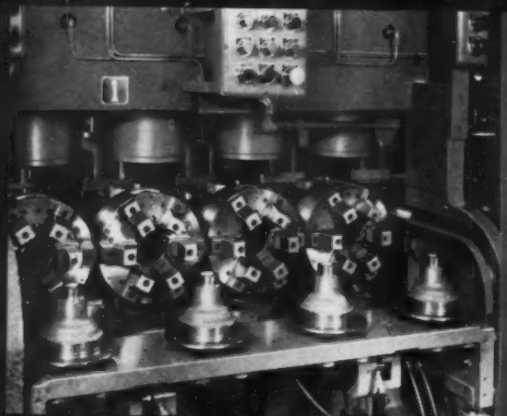
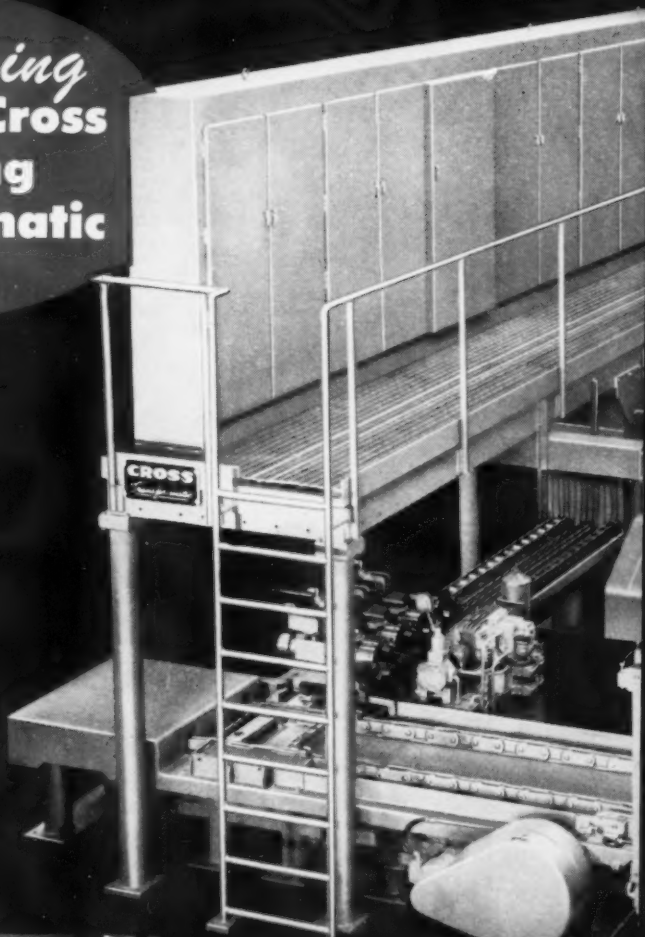
### Shorter Work Week

The federal employee unions are spearheading organized labor's campaign for a shorter work week, more sick leave and longer vacations. The thinking behind this is that it will be relatively easy to persuade Congress to give federal workers these benefits with the assistance of such liberal organizations as the Americans for Democratic Action, American Veterans Committee and the National Farmer's Union. The latter have consistently supported the aims of the AFL-CIO.

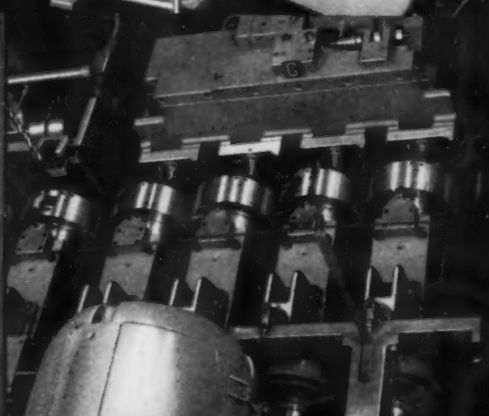
If success in the field of government materializes, the pitch to industry will be to follow the example set by Uncle Sam.

*Announcing*  
**the NEW Cross  
Chucking  
Transfer-matic**

Pat. No. 2,743,767

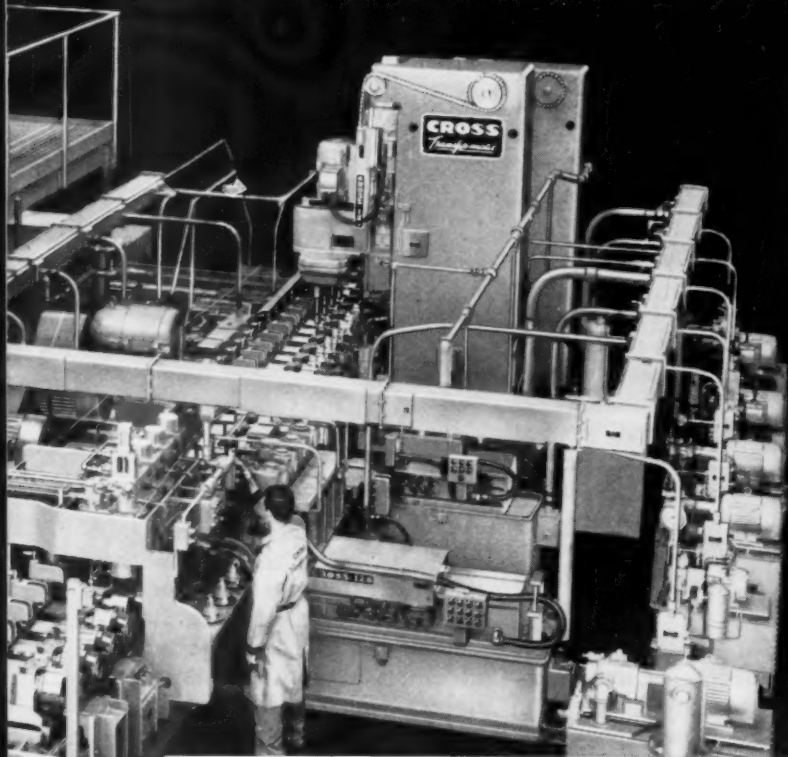


Station 1



Station 4

## *Another Automation First by Cross*



A completely new development! That's the Cross Chucking Transfer-matic . . . the first chucker ever built on this principle. Standard Cross "building block" construction makes provision for any reasonable number of stations and work pieces up to 48" in diameter.

This particular seven station Transfer-Matic, created for differential gear cases, has a rated capacity of 368 pieces per hour at 100% efficiency.

An unusual feature is that the work pieces are chucked and not released until all operations are complete. The chucks are mounted on precision spindles, which in turn are carried on pallets—four to the pallet. There are ten pallets—one at each station and three on the conveyor moving from Station 7 to Station 1.

Operations are: Station 1, four pieces positioned in work holding chucks by loading

mechanism and clamped automatically. Station 2, pilot diameters turned and side gear pockets bored. Station 3, spherical seats generated. Station 4, flange faces and thrust faces for side gears generated. Station 5, pin hole for pinion shaft drilled after spindles are indexed into pre-determined position and locked to prevent rotation. Station 6, pin hole chamfered top and bottom. Station 7, pin hole rough and finish reamed with shuttle head.

Features include construction to JIC Standards, hardened and ground ways, interchangeability of all parts, pre-set tooling and programmed tool changes with the Cross Machine Control Unit.

Established 1898

THE **CROSS** co.  
*First in Automation*  
DETROIT 7, MICHIGAN

## **Mission in Sweden Reports U.S. Trade Interest**

Reports from a five-man trade mission in Sweden—four U. S. businessmen and one government representative—indicate widespread interest in trade with the United States, the U. S. Department of Commerce announced today.

The mission has been visiting principal industrial and commercial cities in southern and central Sweden in advance of the opening of the St. Erik's Fair in Stockholm, September 1 to 16, in which the U. S. government is participating. In all it will have visited eight cities.

The mission reported it was meeting with appreciative audiences everywhere and receiving favorable local newspaper publicity. In Malmo, the newspaper *Sydsvenska Dagbladet* reported that interest in seeking new trade contacts with the U. S. had been so strong in Southern Sweden that the

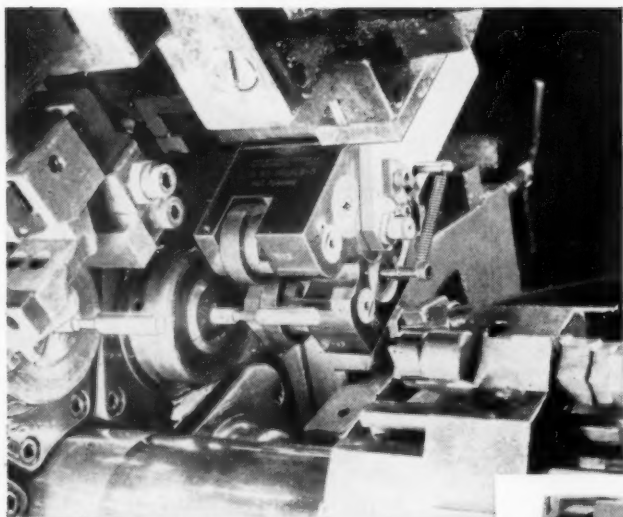
Trade Mission had to arrange additional conference time on Saturday.

Swedish businessmen seemed to be most interested in the following subjects: (1) Market opportunities for individual products, (2) U. S. Customs rates and procedures, (3) Services available from the U. S. Department of Commerce and (4) The state of the U. S. economy.

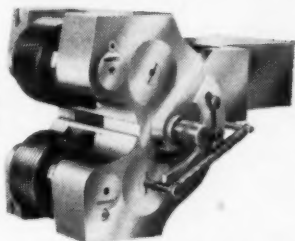
## **October-December Outlook**

Most forecasters see brisk business activity for the remainder of the year. The administration does not fully share the Federal Reserve Board's concern about the danger of inflation. And while money is tighter and the Federal Reserve Board watches vigilantly for inflation symptoms, the administration goes along with the business forecasters that business will make a satisfactory adjustment to the credit stringency.

**Fringe benefit costs.** Payments by employers for pensions, vacations, social security and the like averaged \$819 per employee in 1955, an increase of \$99 since 1953, according to a survey of 1000 companies by the Chamber of Commerce of the U.S. This included \$254 for agreed upon programs of pensions and insurance, \$254 for vacations and holidays, \$145 for legally required programs (Old-Age and Survivors Insurance, Unemployment and Workmen's Compensation and others), \$89 for rest periods, and \$77 for miscellaneous.



*over 1,100,000 threads  
with 1 set of rolls ...*



Long roll life resulting from the basic design of the LANROLL Thread Rolling Attachment is demonstrated in the production of studs at the M & S Morenci Corporation in Morenci, Michigan.

#10-32 pitch NF threads, 350" long, are rolled on 1020 screw stock using a #14 GA LANROLL Attachment on a  $\frac{1}{16}$ " Acme-Gridley Automatic. Rolling next to the collet .030" back of the shoulder, and threads are held to  $\pm .00025$ " on the pitch diameter.

LANROLL Attachments are made in five sizes to roll both fine and coarse pitch threads to Class 4 tolerances. Send specifications and ask for Bulletin G-96.

**LANDIS *Machine* COMPANY**

**WAYNESBORO • PENNSYLVANIA • U. S. A.**

452

### **Apprentice Employment Reaches 180,000**

The upward trend in industrial training is reflected by an increase of more than 17,470 apprentices employed during the past year—bringing the national total to approximately 180,000. This increase is revealed in a report of registered apprentices during the fiscal year ending July 1956, issued by the U.S. Department of Labor's Bureau of Apprenticeship.

The greatest increase in any State in the number of apprentices employed has been in California. That State led the Nation by registering more than 2,525 additional apprentices during the year—a gain of 13 percent—making a total of 20,750, the largest number in any one State. Illinois has second number. Massachusetts and Texas competed for third place with gains respectively of 959 and 957 apprentices. Missouri and Ohio followed

closely with gains of 822 and 815 apprentices employed during the year.

### **Red China Keeps Knocking on the U. N. Door**

Will Red China's persistence in gaining admission to the United Nations continue to be blocked by the U.S.? Our allies say their knock on the U.N. door cannot go unanswered too much longer. Directly after the November elections it is expected that Russia, France and Britain will act vigorously to press for admission of the Chinese Reds. A big fight is anticipated. U.S. warnings of retaliatory measures will be countered with arguments that the free world must be "realistic" that Red China is too big a world power to be ignored. Probable approach of Britain-France-Russia: Nationalist China will retain its Assembly seat; there will be two Chinas in the U.N.

• • •

**Nonferrous metals:** The supply pinch appears to be over, except for nickel and the rarer metals (beryllium, magnesium, thorium, titanium). Aluminum output, 7-9% above '55, is keeping pace with demand. Copper, lead, zinc and tin continue above long-term demand level.

**Both shipments and new orders** for machine tools were higher in August than in July. Net new orders rose from \$61,900,000 in July to \$87,450,000 in August, and shipments from \$65,150,000 to \$75,100,000, according to the National Machine Tool Builders' Association. Sales leaped from a 25% year-to-year gain in the first quarter to 39% in the second quarter, and will continue up. Auto revival and spending spree on cost-cutting new equipment are responsible.



## Special Punches and Die Buttons



## have R-B Standardized Features

Special punch-points and mating die buttons of any shape or size can be made to your specifications and will have all the features of standard R-B equipment. These inherent R-B features include: snap-action radial alignment and vertical locking of special punches and die buttons, speed and ease of insertion or removal, and complete interchangeability. Just a push, a twist and "click" the R-B punch or die button is locked in the retainer—no additional keying required.

No other manufacturer of punches and die buttons can offer you the amount of successful application experience, and the scope of knowledge that is available from the R-B engineering staff for:

- ★ Cutting Your Production Costs
- ★ Reducing Die Designing Time
- ★ Increasing Productivity of Presses
- ★ Supplying Answers to Piercing Problems
- ★ Saving Die Construction Time
- ★ Complete Standardization of Press Tooling



For Additional Information or Engineering Service, Write to:

**RICHARD BROTHERS PUNCH DIVISION**  
**ALLIED PRODUCTS CORPORATION**

DEPT. 87

76424 CAPITOL AVENUE

DETROIT 39, MICHIGAN



## DO YOU MAKE?

- Plastic, Rubber or Glass Molds
- Forging or Die Cast Dies
- Contoured Parts for Ordnance or Aircraft



**YOU CAN SAVE  
UP TO 60%**

Now 2 Major Improvements  
on the Fluid Motion

## REGENT DUPLICATOR

**NEW . . . ADJUSTABLE  
FRICTION BRAKE**

For Selective Table Sensitivity

**NEW . . . CIRCULAR  
BALL BEARING RACEWAYS**

For Even Smoother Table Movement

**MOUNTS IN MINUTES ON YOUR  
BRIDGEPORT AND CINCINNATI  
TOOLMASTER MILLS**

Capacity 6" x 6" — 1 to 1 ratio with  
master. 2 or 3 dimensional with great-  
est accuracy. Single lever table con-  
trol. Table "floats" on precision balls.

For literature write to

**J. M. KALINS & CO.**

1575 Railroad Ave., Bridgeport, Conn.

**REGENT**

## MEETINGS CONVENTIONS EXHIBITIONS

- Nov. 1-2—Society of Automotive Engineers, Inc. National Meeting. The Drake Hotel, Chicago, Ill.
- Nov. 1-4—National Tool & Die Mfrs. Assn. Meeting, Hotel Statler, Hartford, Conn. Association headquarters—907 Public Square Bldg., Cleveland 13, Ohio.
- Nov. 4-8—National Metal Exposition, sponsored by The American Society for Metals, World Metallurgical Congress, National Amphitheatre, Chicago, Ill. Society headquarters: 7301 Euclid Ave., Cleveland, 3, Ohio.
- Nov. 7-9—Steel Founders' Society of America Technical and Operating Conference, Carter Hotel, Cleveland, Ohio.
- Nov. 8-9—Society of Automotive Engineers, Inc., National Fuels and Lubricants Meeting, The Mayo, Tulsa, Okla.
- Nov. 16—American Mining Congress Coal Division Conference, William Penn Hotel, Pittsburgh, Pa. Association headquarters: Ring Bldg., Washington 6, D.C.
- Nov. 17—Society of Carbide Engineers, National Executive Board Meetings, Hotel Bend, Hartford, Conn. Association headquarters: P.O. Box 141, West Hartford 7, Conn.
- Dec. 3—American Mining Congress Annual Membership Meeting, Plaza Hotel, New York, N.Y. Association headquarters: Ring Bldg., Washington 6, D.C.
- Dec. 5-7—AIME Electric Furnace Steel Conference, Metals Branch, Hotel Morrison, Chicago, Ill.
- Dec. 10-11—The Industrial Truck Association Meeting, Biltmore Hotel, New York. Association headquarters: 900 F. Street, N.W., Washington 4, D.C.

Circle No. 282 on Card, Opposite Page 65

## 1957

Jan. 14-18—Society of Automotive Engineers, Inc. Annual Meeting, The Sheraton-Cadillac and Statler Hotels, Detroit, Mich.

Jan. 21-25—American Institute of Electrical Engineers General Winter Meeting, Hotel Statler, New York, N.Y.

Jan. 28-29—Industrial Heating Equipment Association Annual Meeting, The Shoreham, Washington, D.C. Association head-

quarters: Association Bldg., Washington 6, D.C.

Mar. 5-7—Society of Automotive Engineers, Inc. National Passenger Car, Body and Materials Meeting, The Sheraton-Cadillac, Detroit, Mich.

Mar. 20-22—Society of Automotive Engineers, Inc. National Production Meeting and Forum, Hotel Statler, Buffalo, N.Y.

### *"Standard"* MILLING CUTTERS BY THE THOUSANDS!

**From stock—through  
your Brown & Sharpe  
NELCO distributor!**



Brown & Sharpe-NELCO—manufacturing over 3000 Carbide, Carbide Tipped and High Speed Steel milling cutters and accessories—stand behind the distributor displaying this plaque.

You can rely on him to save you days and dollars with superior tools, superior service!

Use the tools that really give you a COMPLETE selection... a speedy solution to all your cutter problems—over 3000 "standards" are as near as your phone.

Switch to the most complete source! See the Brown & Sharpe-NELCO Distributor in your area... today!

SEND for the New Nelco Catalog just off the press, showing over 700 Carbide Tipped Cutting Tools.



# NELCO TOOLS

*For that EXTRA Edge  
in Production!*

NELCO TOOL CO., Inc. • Manchester, Conn.



THE YORK CORPORATION reports:  
**COST SAVING**

**23%**

This Cincinnati Bickford Super Service Radial Drill effects substantial cost savings in general applications. Drilling, tapping and setting fifty  $1\frac{1}{2}$ " diameter studs on this turbo casing, shown above, is done in 185 minutes now as against 242 previously.

The York Corporation tells us that simplified, centralized controls, ease of machine positioning and minimum operator fatigue are important factors in these cost savings.

*Write for bulletin covering these  
Cincinnati Bickford Super Service Radials.*

*Illustration courtesy of the York Corporation, York, Pa.*

**CINCINNATI  
BICKFORD**



**RADIAL AND UPRIGHT DRILLING MACHINES**

**CINCINNATI BICKFORD DIVISION**

GIDDINGS & LEWIS MACHINE TOOL COMPANY

OAKLEY, CINCINNATI 9, OHIO, U.S.A.

Circle No. 284 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

## Automation and Small Business

If any one thing is indicated today as inflation spirals upward it is that small and medium sized plants should explore the possibilities of automation facilities to cut costs and hike production. With automation spreading rapidly from production to assembly, feeding and transfer operations, it has become more justifiable for small plants to automate. Of course caution is needed, because an extra degree of automatic control too often can cost more than it is worth. It goes without saying that if you can't recover your capital investment in a system within a favorable length of time, you will be violating one of the prerequisites to automation as well as a principle of scientific management.

However, there are few operations for which some automated equipment can't be designed. The record shows that some producers of automated equipment are selling more units to firms with less than 500 employees than to those with more than this figure. It is heartening to us to see that the small companies—those with from three to 35 employees who are struggling for existence in tough markets—are carving out a position by increasing production with relatively small cost increments. A recent interview with a small

manufacturer of single point tools proved to us what this type of producer can do when he uses his ingenuity to design his own machine tool attachments to increase production and cut costs.

Here is a case where a small manufacturer is going about automating a piece of equipment at a time, surrounding them with hand operations. Ultimately all these operations will be linked up and this enterprising fellow will find himself in an admirable position in his market.

Other manufacturers are doing much the same thing with varying degrees of success. The metalworking industry's greatest asset has been its ability to progress and accept change. The small metalworking plant owner must adapt himself to the fast changing times or some day he will suffer a rude awakening that he is in no position to compete.

The important thing for the small manufacturer to consider is the necessity to plan wisely so that his investment in automated equipment is recovered in a favorable period of time.

—PAUL A. MELINE  
Managing Editor



## Here's why Blanchard Wheels are best for Blanchard grinding

Almost thirty years ago, Blanchard began developing and manufacturing better grinding wheels for Blanchard Surface Grinders. Our research first produced silicate bonded wheels, and then resinoid bonded wheels.

Today, Blanchard offers silicate, resinoid and vitrified bonded wheels . . . scientifically manufactured and accurately graded in our modern wheel plant.

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**Circle No. 285 on Card, Opposite Page 65**

## LETTERS TO THE EDITOR

MACHINE AND TOOL

**blue book**

**A copy of your timely editorial, "It's Good Business to Knock Business,"** in the August 1956 issue of Machine and Tool Blue Book has been submitted to me.

I would appreciate the privilege of republishing this editorial in full in the current issue of Clover Business Letter, our house organ which is mailed to our customers each month.

We will, of course, quote the source, with full credit to you. . . . as we go to press in a very few days, will you please be kind enough to reply by air mail.

C. J. Fairhurst  
Clover Manufacturing Company  
Norwalk, Conn.

### **4 "Mikes" Missing. Who's Responsible?**

It isn't often that I can obtain one of your publications in my plant, as they are very popular and most of the fellows keep them. However, I did manage to get the August 1956 edition of your "Machine and Tool Blue Book" and in it I found a very interesting section, a little more interesting to me than the rest, because it is very timely and I hope that you may be able to help me with a problem.

My problem ties in with the "How would you decide" section: Is the employer responsible for personal property left on his premises during off hours while the plant is operating a second shift in the machine shop?

I am assigned to the tool room and as is the custom I buy my own pre-

cision measuring tools and general hand tools for my line of work. At the end of the day I return my tools to their respective places in my tool chest, close my chest and leave for home.

The next day I opened my box and found that four "mikes" were missing. A search of the premises failed to find the "mikes." I reported the loss to management and they refuse to be held responsible for my personal property at any time and they say I left it at my own risk.

The tool room is open country to the plant. People walk in and out all day and it has never been locked until now, since my tools were stolen.

My problem as you can see is not unique but a rather ordinary one in shops. Can you please help me?

I'm sure that you have heard my problem before and can help me to get a rendered decision from your "How would you decide" section. Any assistance you may give me would be greatly appreciated.

W. W. J.  
Bronx, New York

Here is our "How Would You Decide" Editor's advice:

"This is not a problem for 'grievance' unless there is something in the union contract which provides for loss of employee property. In the many hundreds of union contracts which have passed through my hands, I have never seen such a clause.

"The general practice is that management is not responsible for personal items lost any more than if an employee lost his wallet in the plant. However, the company may be insured against such losses, even though this is not a wide-spread practice in industry.

"Because this would seem to be a legal problem, the employee might wish to see a lawyer for legal advice. It appears to me that even in such a situation, the employee would have to prove gross negligence on the part of the employer. However, we do not give

legal advice, as this would be objected to by the Bar Association.

"I might add that from the facts submitted in your letter, this does not seem to be a case of gross negligence on the part of the company.

"Sorry we cannot be of more help—if this were a grievance type of matter, we could probably forward citations of similar cases which would show how they were resolved."

### **Tear Sheets to Australia**

We are writing with regard to two articles which appeared in *Machine and Tool Blue Book*, vol. 49, May and November 1953, pages 190, 194 respectively.

As we have been unable to locate a copy of these issues here, we wondered if you might have any copies of the articles or the magazines available, and if so, would you please let us know by return mail, so that we can place an official order.

JOAN M. SCOTT, LIBRARIAN  
STANDARD TELEPHONES &  
CABLES PTY. LTD.  
Alexandria, Sydney, Australia

Very glad to send these on their merry way!

**We have been watching with interest** the various articles you have been running from time to time on your 1906 Advertisers in commemoration of the 50th Anniversary of the Machine and Tool Blue Book and were well pleased with the write-up you gave H. B. Underwood Corporation.

We wish to thank you for your interest and appreciate the honor you have given us in featuring us along with other "Charter Member" Advertisers of Hitchcock's Machine Tool List and trust your efforts have also been of interest to many other readers of *Machine and Tool Blue Book*.

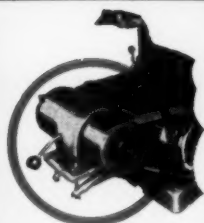
Geo. C. Flannigan, Jr.  
H. B. Underwood Corporation  
Philadelphia, Pa.



**GET**

# New Performance

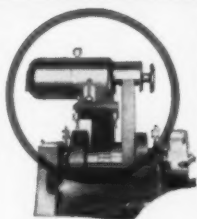
## FROM OLD MACHINE TOOLS



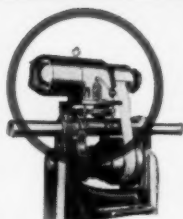
SHAPER



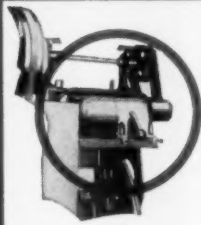
RADIAL DRILL



LATHE



MILLING MACHINE



PLANER

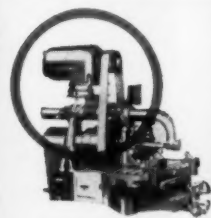


## LIMA GEARSHIFT DRIVES

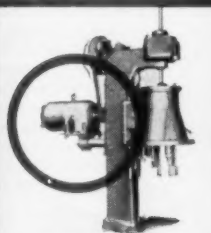
Install modern efficiency in old machine tools—get higher production at lower operating costs!

Lima Gearshift Drives provide outstanding flexibility—available with either four or eight output speeds to assure a correct range of speeds for every job. Full rated horsepower is delivered in all speeds.

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THE LIMA ELECTRIC MOTOR CO., 252 FINDLAY RD., LIMA, OHIO

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**FIRST...FOR DRIVES...MOTORS**



Vinson Steel and Aluminum Co.  
Dallas, Texas says:

Shearing capacity of this machine is 12'-0" x 1/2" mild steel. Note accessibility of two cranks on right end housing. Upper crank is for knife adjustment. Lower one is for back gauge adjustment.

## Adjustable Blade Clearance Allows Use of Shear for Complete Range of Thicknesses

**T**HE feature that Vinson Steel and Aluminum Company likes best on their Steelweld Shear is the adjustable blade clearance. This permits them to use the one machine for their complete range of thicknesses. They go as low as 26 gauge galvanized material and up to 1/2 inch mild steel and 1/4 inch aluminum.

As a leading supplier of metal in North and West Texas, Vinson insists on cuts being sharp, straight and accurate. This requires that the blade clearance be correct for every thickness

cut. Because of the unique easy method of adjusting the clearance on Steelweld Shears, the adjustment can be made in seconds.

Another item which is impressive is the low maintenance cost. This machine has been in service for over two years, and the maintenance has been practically nil.

More and more warehouses are installing Steelweld Shears. Usually one will handle a range of work that would require two or more other type machines not built with a fast knife adjustment feature.



### GET THIS BOOK!

CATALOG No. 5011 gives construction and engineering details. Profusely illustrated.

### THE CLEVELAND CRANE & ENGINEERING CO.

5252 East 282 Street, Wickliffe, Ohio

# STEELWELD PIVOTED BLADE SHEARS

Circle No. 287 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

## LEADERS OF THOUGHT IN INDUSTRY

MACHINE AND TOOL

**blue book**

### **A Training Program Pays Off...**

*... when your employees can run machines to very close tolerances and everyone on the job is thinking about improvements*



**An interview with W. E. Bahl, Vice President  
Manufacturing, National Cash Register Company**

**Q.** *What is the biggest problem facing your manufacturing department today?*

**A.** I would say the training of employees to run machines to very close tolerances is our biggest problem. If a man comes here for a job and he's had experience on a profiling machine, we hire him. But

the type of profiling required by our company is just a little different than most companies. We train the man until he's right for the job.

**Q.** *Do you maintain a training school?*

**A.** Yes, we do maintain a training school. You can't always put a group of people through a training

school, however, and maintain your production schedule. We have set up a regular training program on the job itself to supplement the school. As a matter of fact we have a training program going on all the time. We have the co-operation of the University of Dayton and the University of Cincinnati, and high schools here in Dayton in the setting up of courses that benefit our personnel. We also have evening classes. For any group of 15 employees or more, who are interested in getting together to learn about any subject for their own enlightenment or advancement, we will hire an instructor to teach them.

### Work Simplification

*Q. I understand you have quite a program of work simplification. As the necessity for cutting costs is so prevalent in industry today, would you give us the highlights?*

A. We have the suggestion box system for general employees and process flow charts for foremen, job foremen and men in a supervisory capacity. I believe we were the first company to have such a thing as a suggestion box. An employee's reward for a suggestion is 10 per cent of the savings realized by the company the first year, as well as recognition. The process flow charts are for the men in a

supervisory capacity. These charts show the present and suggested improved flow of operations by diagram and describe the idea in detail. You'd be surprised at the fine suggestions that have been submitted. The overall result is that everyone is looking for some improvement to bring their departmental average up.

*Q. Are these individual or team efforts?*

A. Both. And all suggestions are acknowledged. It's surprising the interest that is being shown.

*Q. Just what are the channels this work simplification idea goes through?*

A. The suggestion has a serial number placed on it and it goes to the Standards Department. Here a group of men do nothing but go over suggestions and diagrams. If the idea is not sound, the committee tells the author why it will not work. Sometimes the creator of the idea takes issue with the committee. Then the committee goes over the suggestion again. If they are of the same opinion, they talk it over with the man and tell him in more detail why it will not work. If a submitted idea looks sound, the man responsible for it doesn't learn of its acceptance until the idea is put into practice.

*Q. Could you give me some figures*

*on what this work simplification program has actually saved the National Cash Register Co.?*

A. The figures here show that the total savings up to July amount to \$471,774. The amount spent on tools totals \$17,233, so the net savings come to \$454,541. In other words, we have reduced the cost of manufacturing just this many dollars. You see, 86% of our work is on a piece rate, so we have good control over our costs and the figures we record here.

*Q. How long has this work simplification program been in effect and how did it get started?*

A. This program of ours is not something that just happened. We had a group of men take a course from Mogensen about five years ago. It is wonderful the way the men got behind this thing. We issue bulletins from time to time, telling the men how far along we're getting with this work simplification program. I'm telling you this program is a wonderful way to get everyone on the job thinking. Occasionally, some methods man or myself will go through the plant, pick up a part, hand it to the job foreman or supervisor and query him: "Now why are we making this part this way?" Many times the answer, after some reflection, will be: "Why you know we could do this or this." We then encourage him to send in a flow chart on it. The more of this sort of questioning that goes on the more the men catch the fever and

start asking questions of themselves and their superiors, "Why are we making this part this way? Why are we drilling this part in this manner? Why couldn't we punch it and cut costs?" If we keep asking "Why?", "Why?" we get the thinking of the men. This is why we have a team working for us.

## **Producing Small Parts**

*Q. To what extent do you manufacture small parts on a mass production basis?*

A. We stock about 150,000 parts for our line of cash registers and accounting machines. And as there are so many combinations that can be built into these machines, we purchase special machines to produce parts on a mass production basis only when the usage justifies it. Our rule is: If the machine will pay for itself in two years, we will buy it. For example, we just installed a cold rolled mill. The figures show that it will pay for itself in two years.

*Q. How do you determine whether or not to make a part yourself or buy it on the outside?*

A. Very few of our parts or components are bought on the outside compared to what we make ourselves. Some components, magnesium castings for example, as well as electrical parts and small parts can be purchased much cheaper by companies who make a business of producing them. Many parts are peculiar to our business, and we

prefer to make them ourselves. We make a good quantity of our parts out of powdered metal. We've developed many of our tools and have had good results.

### Design Changes

*Q. How often do you make design changes, either minor or major?*

A. We do not have yearly model changes, such as some concerns do, but changes are being made all the time. Our Product Development Department is constantly studying systems so that cash registers and accounting machines can be developed to meet system and application requirements. When a customer buys a cash register or accounting machine, he buys a system.

*Q. Just what is the procedure in tooling up to provide the parts that make the machine different for one customer?*

A. The customer wants a machine to do a particular job. The order is taken. The facts are presented to our engineering department who make a thorough study of the problem to determine whether a machine can be designed to do that particular job. One department does nothing but make special parts for special designs that will result in a machine that fits the customer's needs. The drawings are made and

turned over to a foreman. The parts are made and this special equipment is built into the machine.

*Q. You are often called on to design machines to fit certain businesses?*

A. Yes. As an example, the chain food stores vary in their requests to suit their individual needs and to get the specific information they require in their business. This not only applies to key arrangements and totals, but to color schemes and cash drawer arrangements as well. Some want the cash drawer to open in the front, others in the back. Some want double or single drawers and others multiple drawers. Some want metal tills inside the drawers, and so on.

*Q. Does your tool planning group review your machine tool equipment with an eye to replacement?*

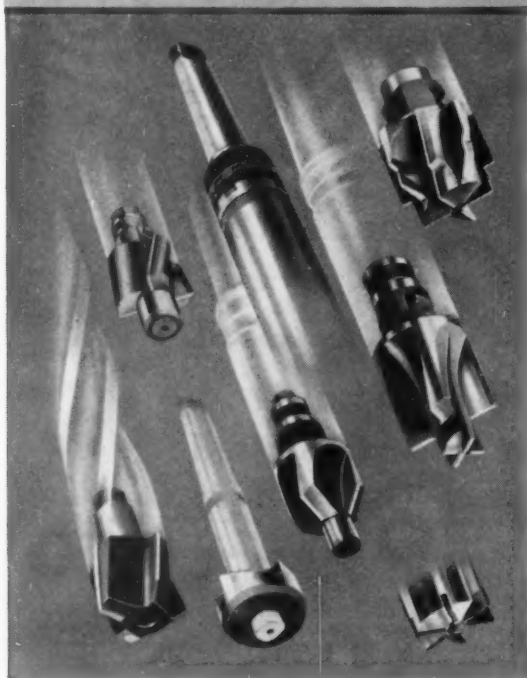
A. Yes. We have spent about \$2 million since the war on new screw machine equipment alone. Here is where the representatives of machine tool builders are a big help to us. A manufacturer's representative sells us on the idea that his machine can do a job for us. The machine is set up and we assign certain people to it. If it does a job, and it can solve our problem, it's in. Incidentally, some machine tool manufacturers' representatives give us valuable information, actually, an education. This we appreciate very much. • • •



# WHAT "Engineered by Eclipse"

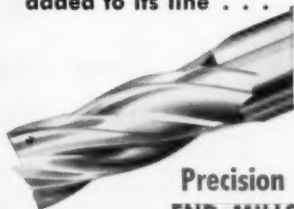
## Means to 2000 Companies

Since 1913 Eclipse has been consistently and efficiently serving many companies in widely diversified fields of production: automotive, farm implement, aircraft, household appliance and other metal fabrications. Each of these companies has found that "Engineered by Eclipse" is assurance of genuine quality in end cutting tools. Eclipse is represented in every major industrial market . . . for your convenience.



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**AND NOW** Eclipse has added to its line . . .



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Ground from the solid for longer tool life and finer finishes.



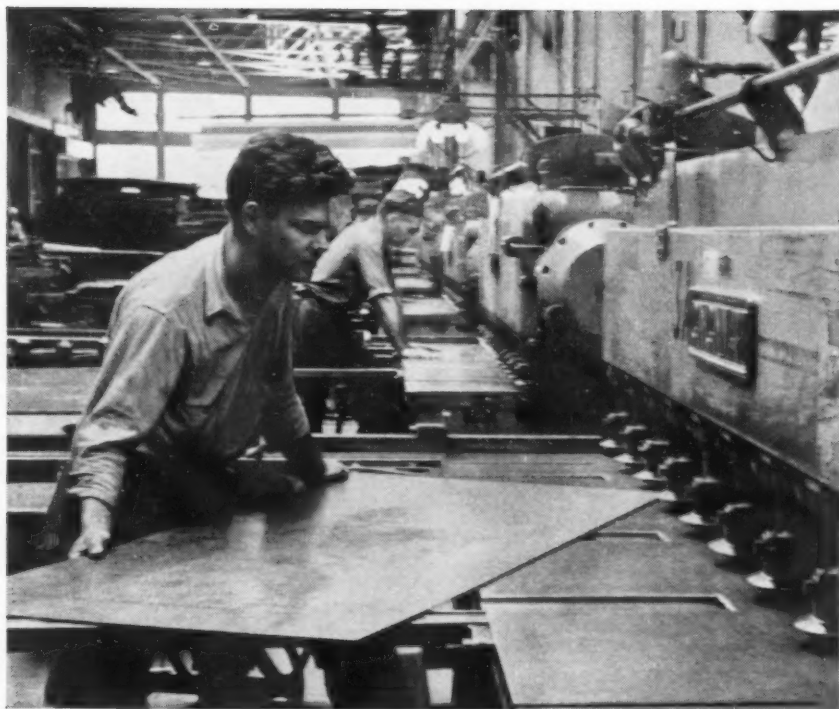
Write for Counterbore Cat. No. 51

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Circle No. 289 on Card, Opposite Page 65

# Setting 90 Deg. Bends in Sheet Metal

Five basic methods to produce an accurate angle

By **Allan Young**  
Tool Design Engineer  
Collins Radio Co.

● The basic problem in bending all types of sheet metal is producing an accurate angle between the two surfaces for full length of

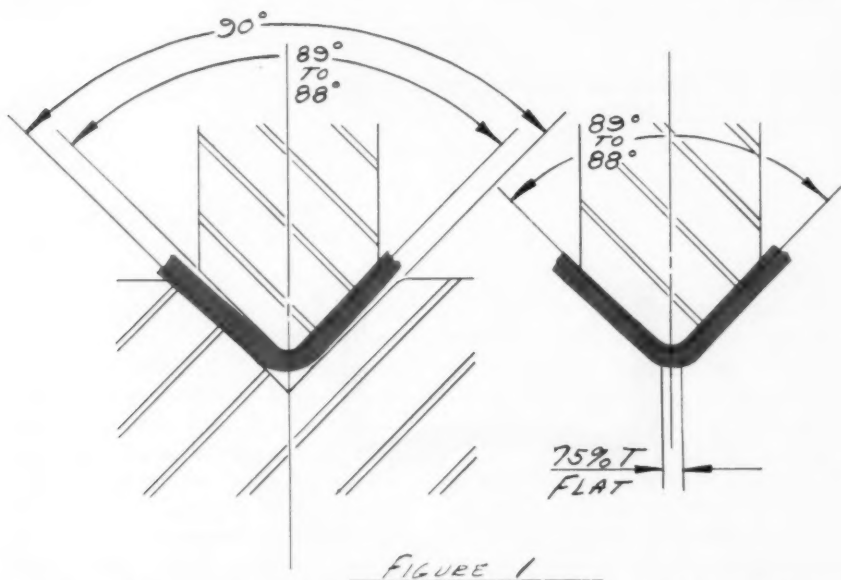


FIGURE 1

1. MOST COMMON form of die for simple bending of one corner. RIGHT: A variation of this type of punch to eliminate development of shrink allowance.

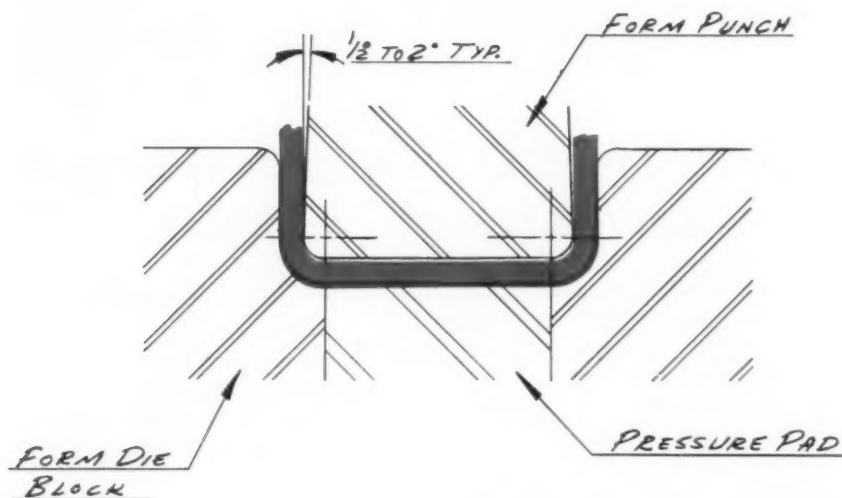
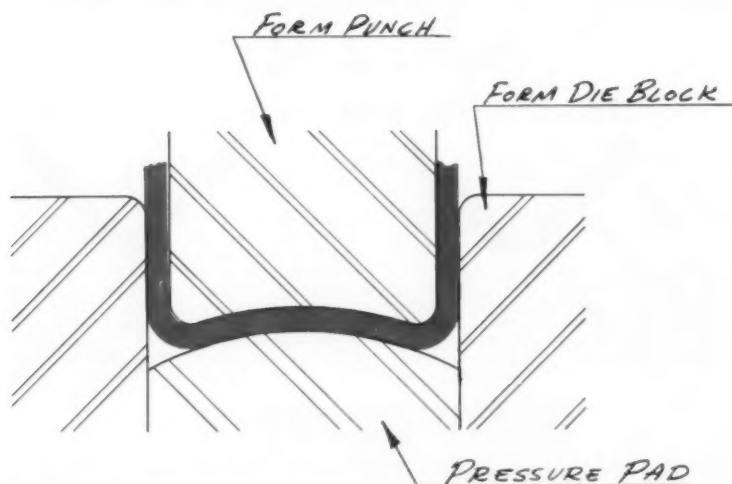


FIGURE 2

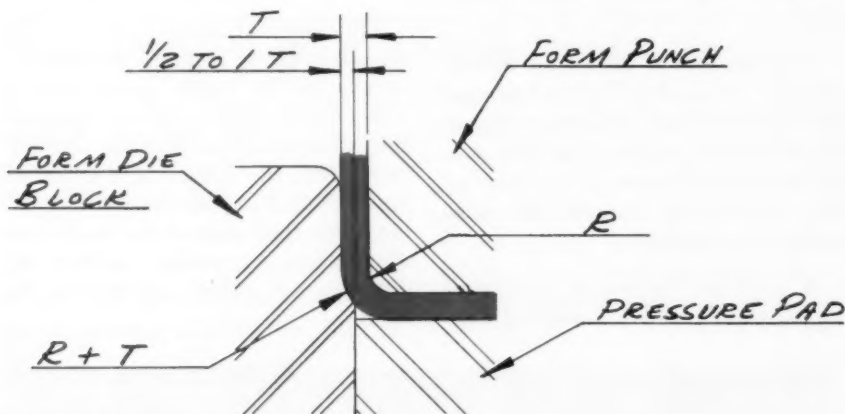
2. U-TYPE FORM DIE using same overbending principle as Fig. 1.



3. VARIATION OF U-TYPE FORM used to control spring back in hardened material.

the bend. This can be done by coining the metal slightly at the corner to prevent springback, or by overbending slightly until the metal springs back to the desired angle. Presented here are five basic methods which have been used successfully to set 90 degree bends in sheet metal.

**Figure 1 shows the most common form of die for simple bending of one corner.**



**4. 90-DEG. BENDS with outside coining of corner.**

This is a simple V-type punch and die block such as that used on press brakes or, for special requirements, built into a die set. The die block is made to the required 90 degree angle and contains the necessary locators or nest for positioning the piece part. The angle should be machined deep enough to clear the outside radius of the bend. The punch angle is one to two degrees less than the required piece-part angle and has the inside

bend radius on it. In this case, depth of entry of the punch controls the amount of overbending necessary to produce a 90 degree bend and can be regulated for variations in material by the press operator.

**The inset to the right in figure 1 shows a variation of this type of punch to eliminate development of shrink allowance.**

To develop overall length of the

piece-part for this type of bending die, inside dimensions only are used. If a flat is ground on the tip of the punch equal to about 75% of the stock thickness, the inside of the metal is coined slightly and forced to flow around the bend replacing that excess metal which is normally calculated for shrinkage. This type of punch can only be used where accuracy of the inside radius of the bend is of no importance.

**Figure 2 is a U-type form die**

## Bending Sheet Metal

continued

*using the same overbending principle as that used in figure 1.*

The control of the angle is not as accurate in this type of die as in figure 1. This type of die is used only for larger thin parts which are to be fitted together at assembly anyway; and accuracy of the angle is not as important as the bend radius.

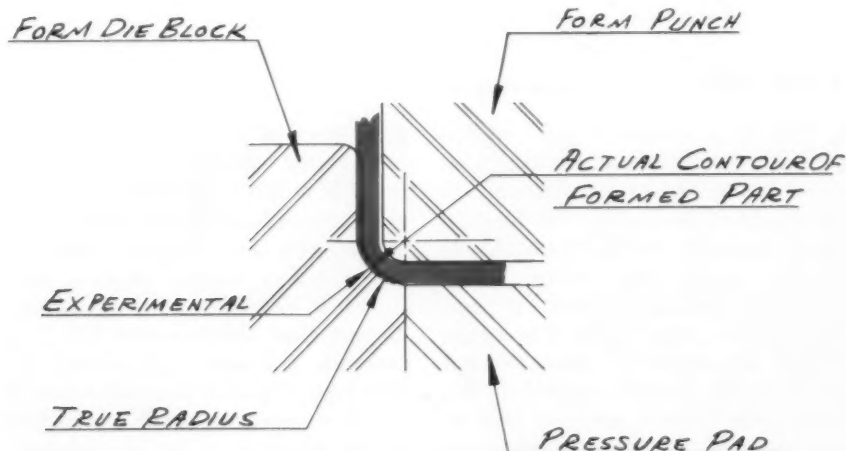
**Figure 3 is a variation of the U-type form which is used to control spring back in hardened material where coining of the material would cause a fracture of the corner or would be altogether impossible.**

A concave radius is machined in the punch and a matching con-

vex radius is machined on the pressure pad. These radii can be attained only by development in the tool room, which naturally should be done with soft blocks.

**Figure 4 shows the best method of setting 90 degree bends with outside coining of the corner.**

This method gives assurance of accuracy of the angle as well as accuracy of the inside bend radius. The outside bend radius is discontinued somewhere between a point even with the inside of the metal and a point at the center line of the stock thickness as shown in the illustration. A standard method of determining shrink allowance is used.



5. FOR CLOSE TOLERANCES ON CORNER, here is good method of bending.

**Figure 5 shows a good method of bending where close tolerances are required on the corner.**

The outside of the metal will not form to a true radius due to stretching of the material. In order to set the corner, the form block must be machined to fit the outside contour of the piece-part. To develop this contour the material must be hand-formed over an inside radius of the required size, and a template made to fit the outside of the part.

A good way to do this is to saw the material at right angles to the bend and grind flat. A template can then be cut from acetate or celluloid sheet to fit this contour and the grinding wheel dressed to match the template. The actual contour of the form block should be made somewhat tighter than the material contour, to give a slight coining action to the form. A standard shrink allowance can be used for this type of bend also. • • •

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## Tracer Controlled Boring Tool

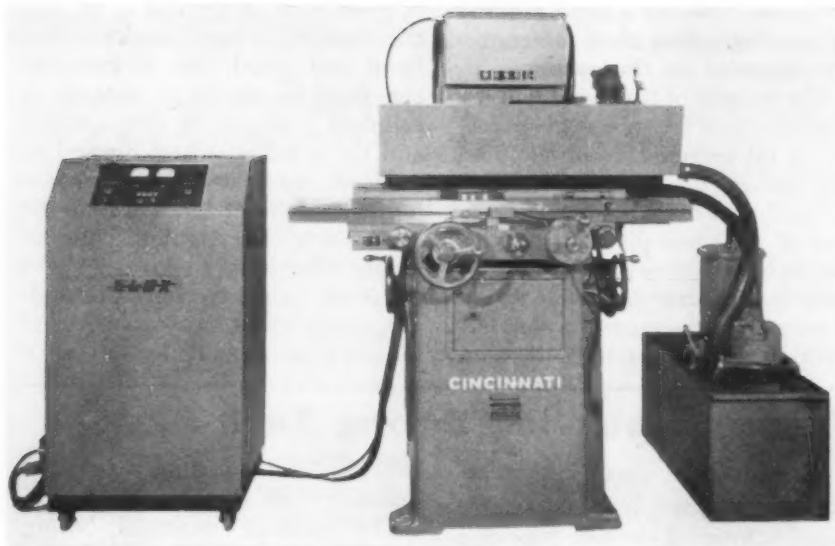
● Employing a tracer controlled, carriage mounted boring tool, the complex internal contour bore of a cone-shaped shaft for a powerful, new 15,000-lb. thrust jet engine is precision machined on an air-gage tracer equipped Monarch 20' manufacturing lathe at the plant of

Diversey Engineering Company, Franklin Park, Ill.

The carriage mounted boring tool permits contouring of depths up to 31-1/2", with machining accuracy under tracer control held within .002". Note the steady-rest used to support the workpiece.

• • •





1. ELOX-CONVERTED Cincinnati No. 2 Tool and Cutter Grinder

## Discharge Machining...

*Can It Save You Money?*

**Yes, if you sharpen 200 or more tungsten carbide tipped single point or 100 insert type tools daily. By substituting brass for diamond wheels you can cut tool regrinding costs 65 per cent.**

By **P. Ianitelli**  
Chief Tool Engineer  
Elox Corp. of Michigan

● The high cost of regrinding or sharpening tungsten carbide tipped single point tools and solid tungsten carbide insert type tools has been a serious problem with many plants.

When our research department at Elox attacked the problem three years ago, we had three main objectives to meet:

1. The equipment developed had to be automatic.

2. Machine and set-up fixtures had to be independent of operator skill.



3. Equipment developed must remove tungsten carbide at rates equal to abrasive wheel grinding.

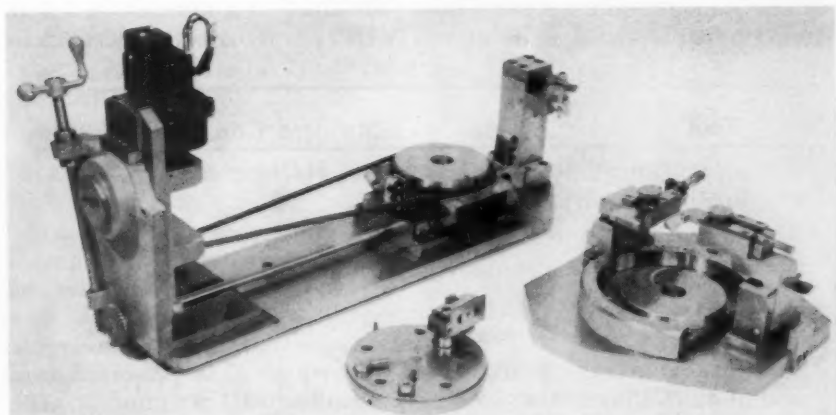
The figures on comparative results of tool sharpening methods, translated into work output, means that in a toolroom sharpening more than 200 single point tools or more than 100 insert tools per day, a

single operator with two machines can:

- Rough carbide faster than any other means known
- Finish carbide faster than any method available
- Produce perfect tools every time, an unprecedented achievement

### Comparative Results of Tool Sharpening Methods

	<i>Metal Removal Rates— ROUGHING</i>	<i>Metal Removal— FINISHING</i>
E.D.M.		
50 ampere power supply (2 machines, 1 operator)	.016 cu in/min	.002 cu in/min
E.D.M.		
28 ampere power supply (2 machines, 1 operator)	.010 cu in/min	.002 cu in/min
Silicon Carbide	.010 cu in/min	not used normally
Diamond Wheels	.005 cu in/min	.001 cu in/min

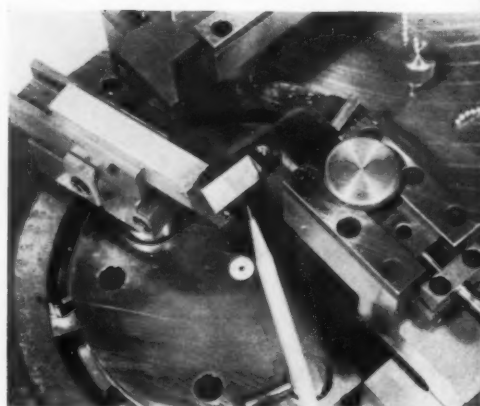


2. 3 MAIN PARTS OF E. D. M. EQUIPMENT: Operating fixture (left) transfer plate (center) and bench set-up fixture.

## How the required radius and side



3. SETTING RADIUS CENTER LINE location from a given side of the fixture.



4. DETERMINING AMOUNT of stock to be removed.

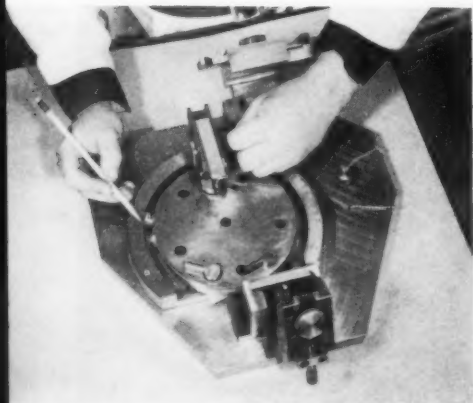
The above statements are based on a critical analysis of X manufacturing company's cost figures as shown in the table. Their costs are calculated as follows:

Using standard grinding methods the job required 6.5 tools at a

grinding cost of \$45.39 per tool or a total cost of \$294.71. Using E.D.M. grinding the job required 1.2 tools at a grinding cost of \$76.83 per tool or a total cost of \$92.19 . . . a monthly saving of \$202.52. By dividing \$202.52 by

Tool	Standard Cost	EDM Cost
$\frac{1}{2}$ " x $1\frac{1}{2}$ " round solid carbide.....	\$1.20	\$ .90
$\frac{3}{8}$ " square solid carbide insert.....	.90	.51
$\frac{1}{2}$ " square carbide insert.....	1.26	.83
$\frac{3}{8}$ " square solid carbide insert.....	.90	.51
	<hr/>	<hr/>
	\$4.26	\$2.75
As a reliable average \$4.26 divided by 4 equals \$1.06 per grind as against \$2.75 Elox cost divided by 4, equalling \$.69 per grind. . . or a 65% cost reduction.		

## clearances are pre-set on the bench



5. SETTING STOPS for accurate included angle.



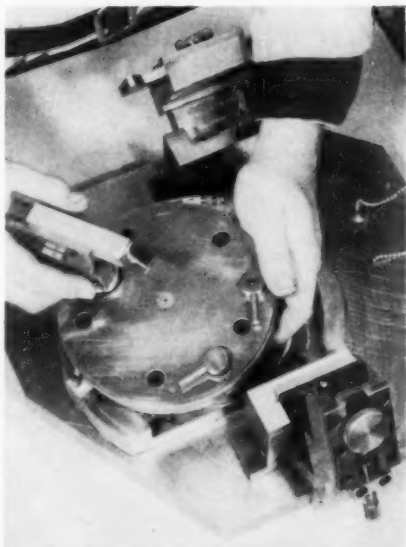
6. SETTING CLEARANCE ANGLE.

the required 6.5 tools, the plant saves \$31 on every insert tool ground on an E.D.M. machine. At \$10,000, a machine tool of this nature should pay for itself in one year. Using a basis of 264 working days per year we save \$40 per day or \$880 per month to pay for the machine.

Some further cost test comparisons are listed on the previous page.

*Since experience reveals that when grinding single point tools, two machines are required for peak efficiency, this calls for amortization of \$20,000 worth of machine tool.*

Savings per tool for single point tools being the same, or almost



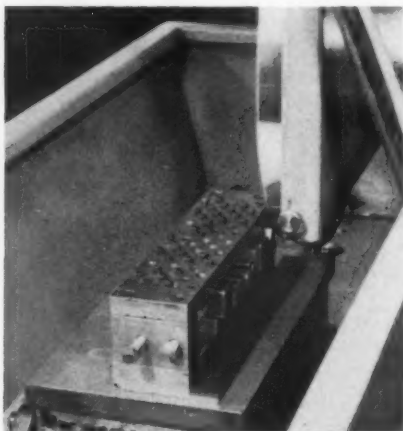
7. REMOVING TRANSFER PLATE from set-up fixture to operate fixture.

## Discharge Machining

continued

### *Tool sharpening cycle in the operating fixture*

identical with that of insert tools, the same savings figure can be applied—an average of 37¢ per grind. Savings of \$80 per day must be realized to pay for the equipment. Translated into work output, it



11. MULTIPLE INSERT TOOLS ready for grinding.

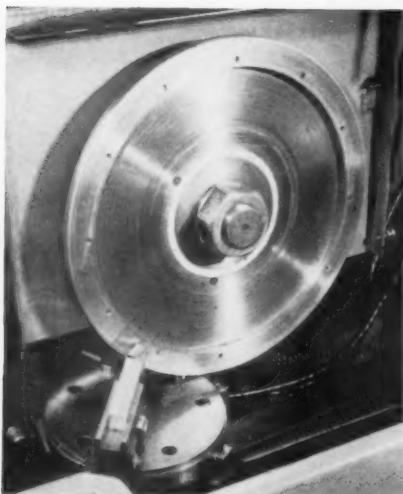


8. IN POSITION for grinding face of tool.

means sharpening a minimum of 210 single point or 93 insert tools daily. The methods charts furnish true specifics on possible savings and speedy amortization of EDM equipment.

Actual test results, covering the machining of more than 2,000,000 production pieces, demonstrate the labor savings of automatic equipment which substitutes brass wheels for diamond wheels. Specifically: a cubic inch of carbide removed for \$3 compared to a former cost of \$25 to \$30. Finished tool quality of an operation is entirely independent of operator skill; *i.e.*, consistent production of tools having perfect radii and blends and free from heat checks.

*Tool life lists in major industries show that EDM ground*



9. FINISHING FACE and generating nose radius.

***tools will give a 5% to 700% better tool life.***

Most single point tools sharpened today are hand sharpened to a metal gage. It is well known this operation requires a great degree of skill and patience with results completely dependent on operator skill. Production is almost impossible to predict because accuracy and number of pieces per hour fall off rapidly with operator fatigue.

With EDM the approach is entirely new.

The equipment consists of three main parts as shown in Figure 2.

1. Operating fixture
2. Set up fixture
3. Transfer fixture.

The required tool radius and side clearances are pre-set on the bench (Figures 3, 4, 5 & 6), then the fix-



10. GRINDING of included angle and side face.

ture is placed in the bed of the machine (Figure 7). The operation from there on is entirely automatic, completely independent of operator skill. An inexperienced operator will produce perfect tools every time, since the principle of the fixture is simple and easy to understand.

This is how EDM operates: Figures 8, 9 and 10 show the tool sharpening cycle in the operating fixture. Figure 8 shows the grinding of the face. Figure 9 shows the generating of the radius and Figure 10 shows the grinding of the included angle and the side face.

The sequence of the operation took only three minutes to produce a perfect tool, free from heat checks and guaranteed to be duplicated exactly in each succeeding piece.

## Discharge Machining

continued

As the tool required only three minutes to sharpen on a single machine, one operator with two ma-

chines can produce one tool every 1½ minutes. A saving of 1 minute per tool with EDM. • • •

X MANUFACTURING COMPANY		Tool No. 40-8-630
Evaluation of Tool Performance		Plant Test No. _____
Tool Cost Analysis Program		Date Started _____
		Date Completed _____
Department: Engine	Monthly Schedule: 113,087 PCS	
Tool Name, Description: 3/8" Square Carbide Insert	Hardness Spec. _____	
Part Name: Bearing	Coolant Ratio _____	
Material No. & Type _____	Rough Cut _____	
Machine Name & No. _____	Finish Cut: X	
Operation Name & No. _____	Depth of Cut _____	
Reason for Text _____		
Speed _____ RPM _____ SFM _____ Feed _____ Per Tooth _____ Per Rev. _____ in/min		
	Standard Grind	E.D.M.
1. Average No. of pieces per grind . . . . .	665	1,296
2. Total regrinds per tool . . . . .	25	73
3. Total runs per tool . . . . .	26	74
4. Total pieces per tool . . . . .	17,290	95,904
5. No. of tools required weekly (monthly schedule divided by 4) . . . . .	6.5	1.2
6. Minutes per grind . . . . .	21.0	13.75
7. Min. per tool change . . . . .	1.5	1.5
8. Total set-up time per tool (3 x 7) . . . . .	39	109.5
9. Monthly machine idle time due to changing tools (5 x 6 + 60) . . . . .	4.2	2.2
10. Price of tool . . . . .	12.54	12.54
11. Cost per grind (6 x .06 per min.) . . . . .	1.26	.83
12. Cost per tool change (7 x .05 per min) . . . . .	.08	.08
13. Total re-grinding cost per tool (2 x 11) . . . . .	31.50	60.59
14. Total cost per tool (10 + 13 + 14) . . . . .	45.34	76.83
15. Total set-up cost per tool (3 x 12) . . . . .	1.30	3.70
16. Total tool cost per piece (15 + 4) . . . . .	.0026	.0008
17. Estimated monthly tool cost (5 x 15) . . . . .	\$294.71	\$92.19

ANALYSIS of X Manufacturing Company's cost figures.

## *I. H. Technical Conference Highlights*

# **Progress Through Automation**

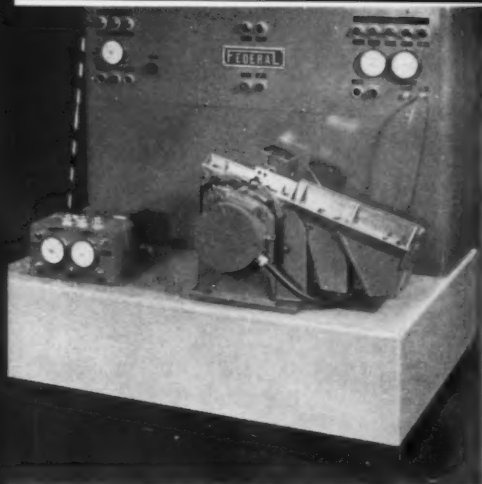
**International Harvester personnel and technical press get a good look at automation at technical conference. Emphasize mechanics, servo and feed-back principles, quality control and movement of materials.**

By **Paul A. Meline**  
Managing Editor

● Recent advances in available manufacturing facilities, specifically in the area of automation, were shown at the 1956 Technical Conference of the International Harvester Co. at their Research Laboratories division in Chicago. The Conference, which was open only to selected IH personnel and the technical press, started Sept. 19 and lasted through Oct. 12.

Keynoting the Conference theme, "Progress Through Automation" were the talks by R. C. Archer, vice president, manufacturing and A. E. W. Johnson, vice president of engineering. These keynote addresses were later presented by the managers of manufacturing of the various divisions as the selected men from these divisions attended the Conference.





**FEDERAL "FEED-BACK" CONTROL** for automatic gaging, sorting and feed-back for inner race bores.

Mr. Archer said that the terms "mechanization" and "automation"

are of little interest to the Harvester Company, as "we are interested in both if they provide us with lower costs, higher quality, greater safety or improved working conditions."

Mr. Johnson reminded the technical personnel that engineering design and testing must be analyzed and evaluated as never before, both from the standpoint of ultimate customer use as well as profit objectives, if the company is to achieve its engineering objectives.

Dr. H. B. Osborne, Jr., Technical Director, Tocco Div., The Ohio Crankshaft Co., presented "A Good Look at Automation." He said that automation costs too much to scrap every year, so the wise course is to



**TURNING ON PUNCH CARD CONTROLLED LATHE** was demonstrated by this Sundstrand Automatic Lathe Model 14. Carbide tools used for roughing; ceramic tools for finishing. SPINDLE SPEEDS: 250 to 1450 RPM; FEED RANGE (Infinite): 7.5 to 300 IPM. Courtesy Sundstrand Machine Tool Co.

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PLATES  
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PIPES  
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FIXTURES  
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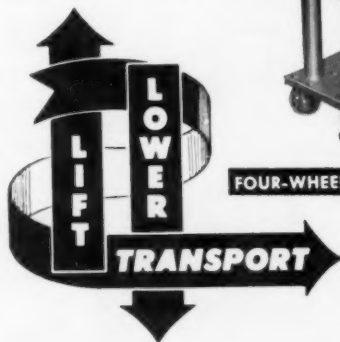
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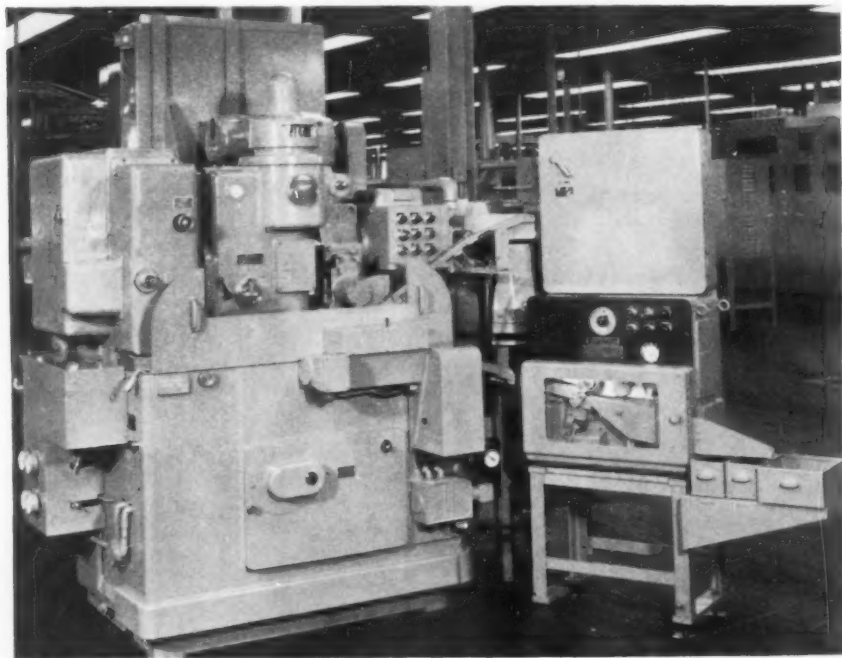
5604

apply it to the things that change least, allow for as many changes as you can and then try to design the manufacturing equipment so that it too can be changed without scrapping anything. "This is a neat trick if you can do it," he said.

According to N. E. Nason, Manager of Engineering, Chicago District, Westinghouse Electric Co., "the step from conveyORIZED manufacture to what we call automation involves the use of more automatic

machines and controls as well as automatic handling between machines."

The subject, "Mechanics of Automation" was presented by Wm. D. Bobco, Armour Research Foundation, Illinois Institute of Technology, on Sept. 24 and by Dr. G. A. Nothmann, of the same organization, at the later sessions. These speakers pointed out that two common characteristics of automation systems are higher speeds and vari-



**A FELLOWS AUTOMATIC PINION CHECKER** checks dimensions, sorts to preset limits, records repeated errors and feeds back information. Courtesy The Fellows Gear Shaper Co.

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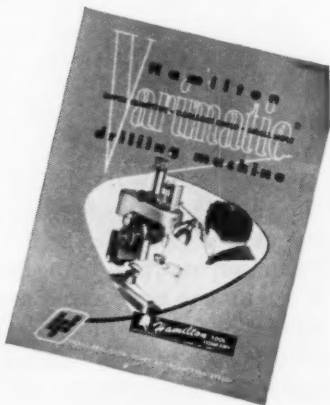
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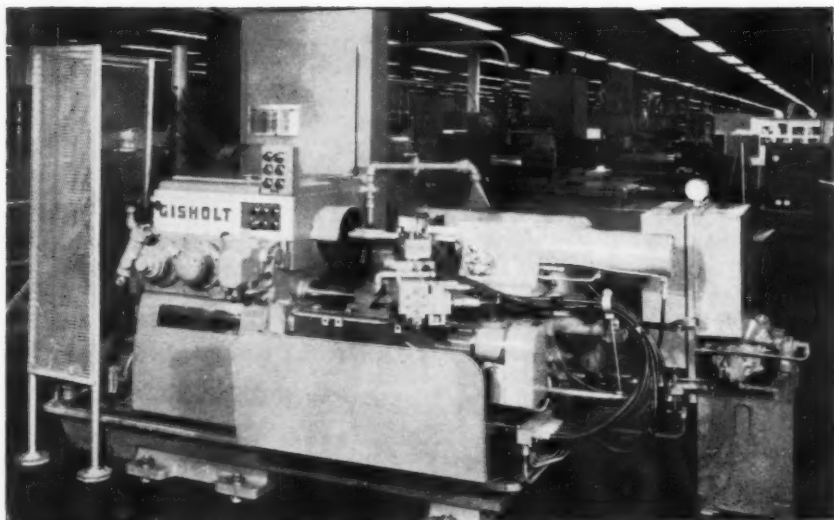
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**GISHOLT AUTOMATIC HYD. TRACER LATHE MODEL 12** produced 1H piece parts. **SPINDLE SPEEDS:** 40 to 2600 RPM; **FEED RANGE (infinite):** 0 to 0.180 IPM. **SWING:** 16 $\frac{1}{4}$  in. Courtesy Gisholt Machine Co.

ability in operation, i.e., their ability to change their operating parameters in accordance with a dynamic input signal. This had made the requirement for thorough theoretical analysis and, based on it, prediction of performance at the "drawing board" stage, very vital.

Servo and Feed-back principles were explained by Tracey E. Johntz and Fred L. Kahl, application engineers for the Chicago office, General Electric Company.

A servo-mechanism is a power device that will respond to a small signal. For example, such a mechanism equipped with feed-back is the human arm; also, fingers and legs. When the brain sends a signal to the arm to raise muscles to a horizontal position, the reason the

arm does not continue on beyond the horizontal position is feed-back.

"Automation—an Aid to Quality Control" was the subject presented from various angles by the following speakers: L. O. Heinold, Jr., and R. Allen Souler, Federal Products Corporation; J. S. Broatch, Pratt and Whitney Company; H. R. Swenson, Illinois Institute of Technology; and John A. Harrington, The DoAll Company.

The movement of materials is a process that adds location value to an item and therefore is a positive contribution to manufacturing. F. H. Wiley, general supervisor of materials handling research, International Harvester Co., assured Harvester personnel.

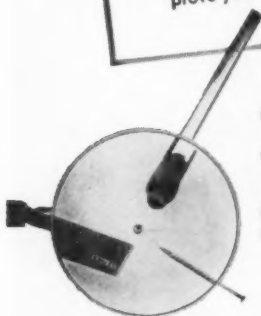
"We must now reduce our materials handling problems to formu-



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**YOU** who use small, fine pitch, precision gears can increase your gear production without sacrifice of gear accuracy, or improve your gear accuracy without sacrifice of gear production.



The Hamilton Precision Gear Hobber, the hobber with a "reserve of accuracy," regularly holds work spindle and hob spindle runout to less than .0002", workspindle and tailstock spindle alignment to less than .0002", and this workmanship is maintained throughout the machine.



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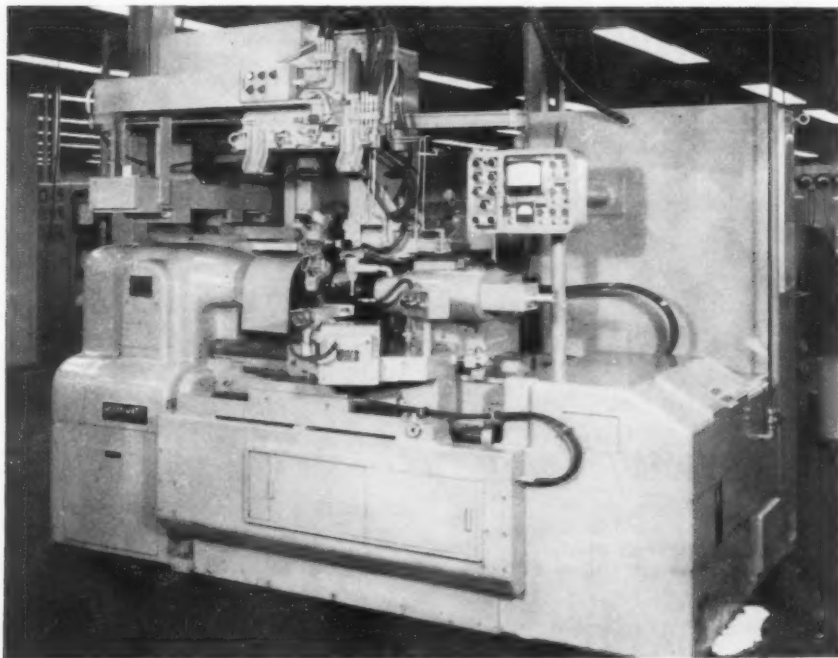
lae which can be calculated by electronic data processing machines," Mr. Wiley said. "It appears that the first to be tackled will be stock arrangement in warehouse, machine arrangement and scheduling of vehicles."

A number of examples of welding operations which have utilized principles of automation to varying degrees were shown on film slides and discussed by R. C.

Becker, of the Welding Research division of International Harvester.

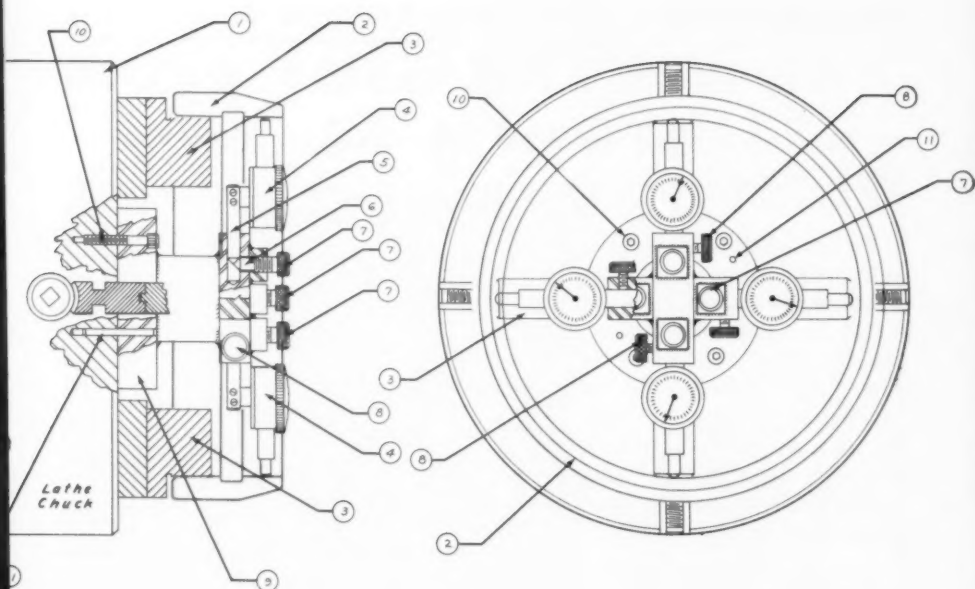
Garnet P. Phillips, general supervisor of Foundry Research, International Harvester Co., said it is increasingly difficult to get men to do the hot and dirty jobs in a foundry. Thus, it is safe to predict there will be greater automation in the foundry to remove the manual efforts from the operations associated with these conditions.

• • •



**ROUGH AND FINISH TURNING** was demonstrated on a Monarch "Mon-a-matic" Lathe model 21, tracer controlled, fully automatic with load and unload mechanism. SPINDLE SPEEDS: 155 to 2700 RPM; FRONT GEAR BOX FEED: 2.5 to 30 IPM; REAR CARRIAGE FEED: 0.5 to 15 IPM. Courtesy Monarch Machine Tool Co.





## Indicating Fixture

... solves problem of finishing O.D. sur-

faces of 14" diameter cast steel rings

*Chuck jaws are adjusted to fit snugly against I.D. of work until each dial indicator registers "zero"*

By **H. J. Gerber**

Oklahoma Institute of Technology

● Approximately 1200 14"-diameter cast steel rings (No. 2) were to be very accurately machined on all I.D. and O.D. surfaces. Concentricity and circularity tolerances were only .0005". No difficulty was experienced in chuck-

ing the pieces in a four jaw chuck (independent) on an engine lathe and precision boring the I.D.'s.

To finish the O.D. surfaces within the close limits mentioned above, however, did prove to be very difficult. The available self centering chucks were not nearly accurate enough to maintain the required concentricity. Also, setting up in the four jaw independent chuck by gripping on the previously machined I.D. surfaces proved to be excessively slow.

Six pieces were run by this method, dialing each one in to accurate alignment in concentricity. The set up time by this method averaged 26 minutes for each piece. A further difficulty was experienced in the warping of the pieces out of round by excessive tightening of the individual chuck jaws. It was obvious that this method would prove to be excessive in cost and some sort of tooling up would have to be done to prevent a loss on the contract. The tooling budget was necessarily limited so several proposals for precision arbors were rejected.

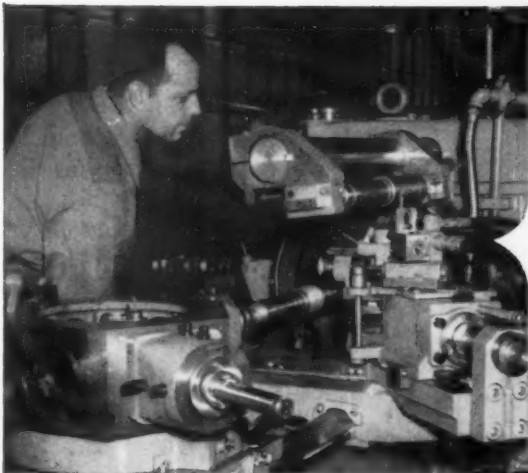
***It was decided to modify the independent chuck (No. 1) in order that it could quickly be adjusted to precision settings on the workpiece.***

The chuck was equipped with soft jaws and these jaws were carefully turned true at the radius of the I.D. of the rings. A support spider (No. 9) was welded up from steel bar stock, machined, and secured to the chuck face by cap screws (10) and dowel pins (11). This "spider" had been drilled and reamed radially on its four arms to fit the four support rods (5) upon which four dial indicators (4) reading in tenth of thousandths increments, were mounted. These support rods could be adjusted outward or inward by use of the angular ended jacking screws (7) which contacted the support rods (5). A lock screw, (8) on each support rod held the indicator in position once it was set.

***Each indicator contact point was set to the correct distance from center by revolving the chuck to bring the contact points to touch a round bar held in the tool post and set at the correct radial distance from center of rotation.***

The indicator contacts were actually set several thousandths beyond the true inner radius point of the I.D. so as to insure that there would always be enough pressure against the contact to bring the needle about a quarter of a turn

# WARNER & SWASEY WITH NEW CONTOUR UNIT DOES FULL DAY'S WORK IN 66 MINUTES!



## Machines both bar and chucking jobs

45" PUMP SHAFT, made of 50 carbon steel, has all its 19 diameters roughed and finished by contour unit.

STAINLESS STEEL DIAPHRAGM, 12 1/2" diam and 2 7/8" thick, has intricate surfaces requiring fine finishes—all machined on the contour unit.



J. S. COFFIN, JR. COMPANY, Englewood, N. J. accomplished this startling time reduction on the 45" pump shaft, shown above. They transferred it from a fairly new standard turret lathe to a 2-A Extra Heavy Duty Turret Lathe equipped with Warner & Swasey's new Contour Unit.

This shaft, for their boiler feed pumps, has 19 different diameters, with as little as .010" difference between some adjacent diameters. It also has a taper and 4 Class 3 threads. Previously, it required 7 hours of machining on a standard turret lathe, using accepted turret lathe practice—indicating the money-saving advantages of this new Warner & Swasey Contour Unit.

Now the shaft is quickly cut down from 3 1/4" bar stock to finished diameters

ranging between 1 3/8" to 2 7/8" using the separate rough and finish cutters in the hydraulically-operated unit's turret. It is roughed out with two and three cuts using the same cutter by simply flipping the tracer unit's leaf stops. A finish cut is then taken over the entire length of the shaft. From start to finish—only 66 minutes, including many other conventional cuts!

This unique contour unit also machines the intricate stainless steel diaphragm shown, providing Coffin similar time savings.

Operators like the unit's fast setup, and the over-all ease of machine handling that results from the 2-A's automatic head shifting. After pre-selecting his speeds, and pushing the master lever, an operator can position tools for the

next cut while the head automatically shifts.

This story shows the time and money-saving possibilities this new, versatile combination of turret lathe and contour unit opens for you. For the complete facts on how it can cut costs for you, call in your Warner & Swasey Field Representative.

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Circle No. 293 on Card, Opposite Page 65

around the dial at correct position. Each indicator dial was now adjusted to read zero and indicator support rods were clamped tightly in place by thumb screw (8).

The work piece is now set onto the jaws of the chuck and each jaw adjusted to bring it snugly against the I.D. of the work and until each dial registered zero.

*The dial settings not only permit a rapid set up for concentricity but also act as pressure gages to warn the operator when he was distorting the work by excessive tightening of the jaws.*

After the first piece was chucked and jaws set in position it was

found that subsequent workpieces could be set up to the prescribed limits in less than three minutes. Set up time was therefore only about 10% of the original set up time without this indicating fixture and the resulting saving in time made this job a very profitable one for the shop. On the initial run alone the savings ran over \$2500 and the device was subsequently used at regular intervals for re-orders of the same work piece. A further saving was permitted by the use of a semi-skilled machine operator who was able to run this job with no difficulty and very little scrap. Tool cost was less than \$325. . . .

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always a clean one handy



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Check your production line. See how much time the men are forced to waste each day in order to keep supplied with fresh wiping material.

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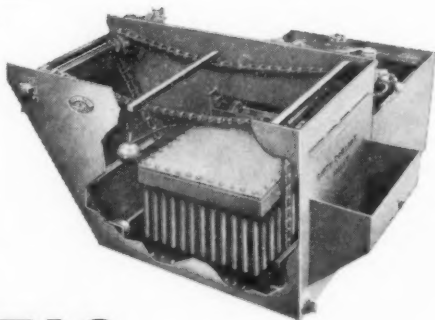


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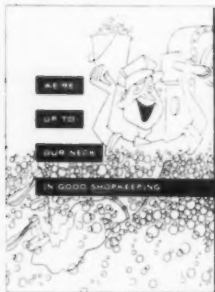
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# FREE LITERATURE

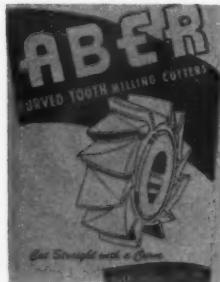
MACHINE AND TOOL

blue book

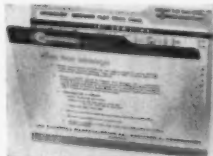
(See Number 1.)



(See Number 2.)



(See Number 3.)



**1. Good Shopkeeping.** In light cartoon style this booklet outlines a program for healthier, cleaner working conditions, cleaner machines, increased production efficiency. F. E. Anderson Oil Co., Portland, Conn.

**2. Curved Tooth Milling Cutters.** Catalog lists advantages of curved tooth principle: accurate control of limits and finish; better performance, etc. Data sheet tells how to sharpen cutters. Aber Engin. Wks., Waterford, Wis.

**3. Tool Steel.** Combination wall chart and file folder lists standard sizes of Microloy ground flat tool steel. Reverse side carries information on physical characteristics, tolerances. Capewell Mfg. Co., Hartford, Conn.

**4. Deburring and Finishing Equipment.** Bulletins display barrel finishers, fixture machines, handling and separating equipment. Free sample processing, research service. Almco Div., Queen Stove Wks., Albert Lea, Minn.

**5. Lubrication Newsletter** (No. 2) discusses the reduction of friction, galling and seizing in threaded connections and power screws. Application stories of extreme pressure lubrication. Alpha Molykote Corp., Stamford, Conn.

**6. Crane Operation and Hitching.** Well-illustrated 75-page pocket-size manual carries rules of crane operation, describes safe hitching equipment, practices. Allis-Chalmers Safety Services Sect., Box 512, Milwaukee, Wis.

**7. Apprenticeship Past and Present.** This booklet is a story of apprentice training in the skilled trades since Colonial days. Early indentures are contrasted with present-day apprentice agreements. U. S. Dept. of Labor.

**8. Flat Stock.** Recommended uses, prices of each grade of the manufacturer's tool and die steel are included in this catalog. Heat treatment data is also given. Marshall Steel Co., P.O. Box 108, La Grange, Ill.

**9. Stainless Steel Pipe.** Bulletin TB-410 covers use of stainless steel pipe and welding fittings where corrosion and/or elevated temperatures are determining factors. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

To receive copies of literature described on these pages, simply encircle corresponding numbers on handy postage-free Action Cards opposite page 64 and elsewhere in this issue.

## Free Literature

continued

**10. "Forgeland U.S.A."** is a colorful cartoon narration for youngsters, tracing the history and workings of the forging industry. Erie Foundry Co., Erie, Pa.

**11. Friction Sawing.** Booklet gives advantages and principle of friction sawing. Saw selection, cutting recommendations are covered. DoAll Co., Des Plaines, Ill.

**12. Case Histories** of successful machines and methods are told in a book giving quick-reference tooling and production details. Bodine Corp., Bridgeport, Conn.

**13. Engineering Catalog D56** is a comprehensive study of power transmission equipment: chains, V-belt drives, speed reducers, etc. Dodge Mfg. Co., Mishawaka, Ind.

**14. Tap Catalog and Guide.** Fast reference to data on entire line, tables and information to solve many tap problems. Wood & Spencer Co., Cleveland 3, O.

**15. Gage Parts.** Leaflet shows method of making plug, ring gages: pick blank size, handle; grind, lap blank to tolerance. Huron Mach. Prod., 6252 Monroe, Dearborn.

**16. Tool Steel Handbook.** Latest information on tool steels: types, properties and applications. Also available, "The Working of Tool and High Speed Steels." Allegheny Ludlum Steel Corp., Pittsburgh 22.

**17. Woodruff Keyseat Cutters.** Catalog sheet describes cutters, gives price of each size. Supreme Keyseat Cutters Co., 1328 43rd St., Kenosha, Wis.

**18. Surface Grinder.** No. 618 hand feed precision surface grinder (6" x 18" x 12") is presented in an eight-page catalog. Abrasive Machine Tool Co., E. Providence, R. I.

**19. Dihedral Couplings.** Catalog No. 62 covers Series D-100 standard, floating shaft and mill motor type dihedral couplings. Complete working data given. Ajax Flexible Coupling Co., Inc., Westfield, N.Y.

**20. Rotary Surface Grinders.** Folders describe Model E (12"-16" sizes) and Model F (12" chuck) grinders. Arter Grinding Machine Co., 15 Sagamore Rd., Worcester 5, Mass.

**21. Flute Grinder.** Bulletin No. 654 shows how to save in tap costs, make sure of uniform tapped holes. Edward Blake Co., 437 Cherry St., W. Newton 65, Mass.

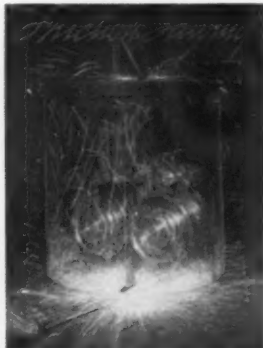
**22. Mechanical Convection Ovens,** muffle furnaces, gravity type ovens, pyrometers are all described in Bulletin 5660, Blue M Electric Co., 138th & Chatham St., Blue Island, Ill.

**23. High Frequency Wheelheads.** Speeds from 10,000 to 100,000 rpm, finishes as fine as 1/4 of a micro-inch are claimed for wheelheads illustrated in bulletin from the Bryant Chucking Grinder Co., Springfield, Vt.

(See Number 10.)



(See Number 11.)



(See Number 12.)



## Free Literature

continued

**24. Precision Surface Equipment.** Catalog No. 838-V has complete information, including prices, on angle plates, V-blocks, box parallels, universal right angle irons, etc. Challenge Machinery Co., Grand Haven, Mich.

**25. Barrel Finisher.** The Handee Slide-Abrader is used with all conventional types of tumbling media and compounds. Flyer from Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago.

**26. Free Envelope.** For a copy of catalog of transparent acetate envelopes plus a free 8½" x 11" acetate job ticket holder, write Dept. BB, American Kleer-Vu Plastics, Inc., 53-06 Grand Ave., Maspeth 78, N.Y.

**27. Manually operated chucks.** Catalog features simplified method of chuck listing for quick, easy selection of type desired. Cushman Chuck Co., Hartford, Conn.

**28. Radial Draw Formers.** 60-page catalog contains examples, with illustrations and diagrams, of machines that will handle work to 300 tons. Cyril Bath Co., Solon, O.

**29. Grinding Wheel Balancing.** Booklet describes automatic balancing feature for Filmatic plain, roll and centerless grinders. Cincinnati Grinders Inc., Cincinnati 9, O.

**30. Clamps,** clamp fixtures, hand screws, chisels, punches, star drills, etc., are pictured in Catalog No. 65, The Cincinnati Tool Co., Cincinnati 12, O.

**31. Granite Surface Plates.** Technical manual fully describes the manufacture of Microflat black granite surface plates and accessories. Collins Microflat Co., 2326 E. 8th St., Los Angeles 21, Calif.

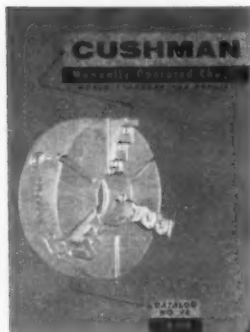
**32. Boring and Milling Machine.** This German import, Uma BF-55, permits use of carbide inserted milling cutters up to 9-¾" dia. Folder available from Columbia International Corp., 10-35 44th Drive, Long Island City 1, N.Y.

**33. Measuring Flatness** with light band readings is explained through words and drawings in Bulletin No. L-404-1, Crane Packing Co., Lapmaster Div., 6400 Oakton St., Morton Grove, Ill.

**34. Air-operated Chucks.** Using photographs and diagrams, this 20-page booklet describes Stace precision air chucks, holding fixtures, jaws, roughing fixtures, air systems, adapter plates. Crodian & Co., 4897 Kessler Blvd., Indianapolis 20, Ind.

**35. "So You Want to Increase Production!"** is the name of an 8-page publication which shows by means of case histories how profits and production can be increased through machinery mountings. Korfund Co., Inc., 48-39W 32nd Place, Long Island City 1, N.Y.

(See Number 27.)



(See Number 28.)



(See Number 35.)



## Free Literature

continued

**36. Flex-A-Belt.** Direct contact wheel for grinding, polishing, deburring; fast interchange from platen to formed belt grinding are two of features claimed for Model DBA-1F Flex-A-Belt multi-purpose machine in leaflet from Curtis Machine Corp. 1300 E. Second St., Jamestown, N.Y.

**37. Die Casting Machine.** Denser castings, positive locking, less down time, longer life are said to be attributes of Wedge-lock machine. Folder issued by Cuyahoga Industries, 17920 Waterloo Rd., Cleveland, O.

**38. Die Set Lubrication Gun.** A well illustrated catalog page describes a gun which is claimed to make die set lubrication easier than ever before. Danly Machine Specialties, Inc., 2100 S. Laramie Ave., Chicago 50, Ill.

**39. Pneumatic Die Cushion.** Bulletin describes new improved Model HD pneumatic die cushion. Dayton Rogers Mfg. Co., Minneapolis 7, Minn.

**40. Limit Switches.** Bulletin 356 presents Loxswitch limit switches. Cutaway illustration shows each component, clearly labeled. R. B. Denison Mfg. Co., 102 St. Clair Ave., Cleveland 13, O.

**41. Hydraulic Cylinders.** Design of the gland and method of prestressing the snapping by drawing the gland tight against it prevents it from wearing the snap ring groove. Folder and price list from Densmore Eng. Co., Inc., 235 Greenleaf, Compton, Calif.

**42. Carbide Blanks.** Wide range of blanks for every cutting need are listed in 12-page Catalog 851C. Besly-Welles Corp., 851 Dearborn Ave., So. Beloit, Ill.

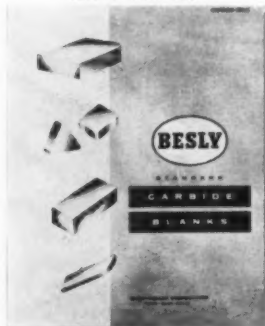
**43. Screw Machine Tools.** Box Tools, deep hole drilling tools, driving units, reamer holders, etc., are skilfully presented in attractive brochure. Boyar-Schultz Corp., 2000 S. 25th Ave., Broadview, Ill.

**44. Window Washing Systems.** Equipment enables window washers, maintenance men to elevate or lower themselves and travel along walls safely. Booklet No. 2022-A, Cleveland Crane & Eng. Co., Wickliffe, O.

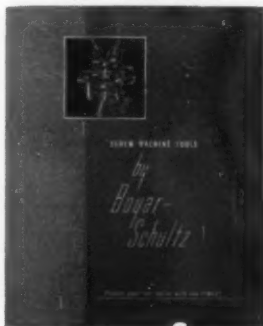
**45. Metal Sheet Feeder.** Six-page folder describes 150-sheet-per-minute feeder. Handles sheets ranging from 19" x 19" to 36"x44", and from 38 to 20 gauge thick. Dexter Folder Co., 330 W. 42nd St., New York.

**46. Diamond Tools.** Literature tells how to select right diamond tool for the job. Available from Diamond Tool Research Co., Inc., 380 Second Ave., New York 10, N.Y.

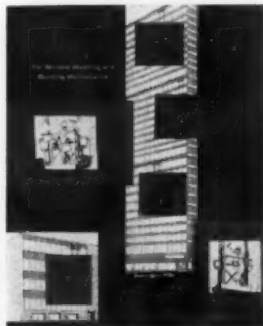
(See Number 42.)



(See Number 43.)

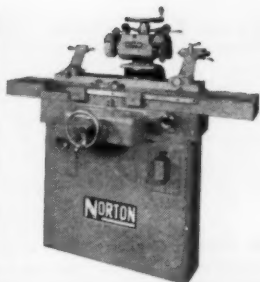


(See Number 44.)



# The wheel head tilts!

No other cutter and  
tool grinder does  
so many jobs and...



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so much  
money

On the Norton No. 20 cutter and tool grinder the wheel head can be tilted up to 15° above or below horizontal, and swiveled through 360° — simplifying such difficult jobs as grinding taper reamers, step counterbores, form tools and milling cutters.

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See your Norton Representative for further facts on the No. 20. Ask him for Catalog 189. And remember: only Norton offers you such long experience in both grinding machines and grinding wheels to help you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass.



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Grinding Machines • Refractories

BEHR-MANNING PRODUCTS: Coated Abrasives  
Sharpening Stones • Behr-cat Tapes

## Free Literature

continued

**47. Electronic Micrometers.** Bulletin 4003 pictures four reference standard electronic micrometers for making direct measurements to 20 millionths of an inch. J. W. Dice Co., Englewood, N.J.

**48. Plastic Tooling.** Digest summarizes applications of plastic tooling for metal forming, plastics forming, and in foundry practice. Marbette Corp., 37-31 Thirtieth St., Long Island City 1, N.Y.

**49. Drilling Unit.** The Drillunit is mounted on machines in any position for hard-to-reach holes. Leaflet from Drillunit, Inc., 3267 Wight St., Detroit 7, Mich.

**50. Binocular Magnifier.** Photographs show "on the job" uses for the Magni-Focuser 3-D magnifier. Edroy Products Co., 480 Lexington Ave., New York 17.

**51. Ventilated Clutch.** Constricting action and ventilated construction make the VC Ventorque clutch suitable for roughest service. Bulletin ML-102-A, Fawick Airflex Div., Fawick Corp., 9919 Clinton Rd., Cleveland 11, O.

**52. Swaging Machines.** Catalog illustrates manufacturer's complete line. Contains technical information about rotary swaging process. The Fenn Mfg. Co., Fenn Rd., Newington, Conn.

**53. Oil-Relief, By-Pass Hydraulic Valves.** Mechanical data book is illustrated with photographs, charts and drawings; contains information on installation and maintenance. Fulflo Specialties, Co., Inc., Blanchester, O.

**54. Grooved Fasteners.** This 24-page Driv-Lok pin catalog explains principle of these fasteners, lists and illustrates typical applications of each type. Driv-Lok Pin Co., Syracuse, Ill.

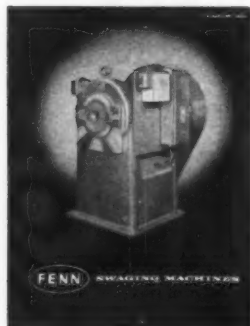
**55. "A Handbook on Tool Room Grinding"** is a 222-page book which combines under one cover the information previously found in three booklets. Norton Co., Worcester 6, Mass.

**56. Magnetic Separator, Filter.** Catalog sheets and bulletin present separator with adjustable legs and automatic dragout tank; combined magnetic separator and filter; disposable belt filter. Industrial Filtration Co., Lebanon, Ind.

**57. Free Slide-Guide.** Device provides at-a-glance comparisons of 21 essential specifications to be considered in purchasing a milling machine. Greaves Machine Tool Co., 2600 Eastern Ave., Cincinnati 2, O.

To receive copies of literature described on these pages, simply encircle corresponding numbers on handy postage-free Action Cards opposite page 64 and elsewhere in this issue.

(See Number 52.)



(See Number 54)



(See Number 55.)





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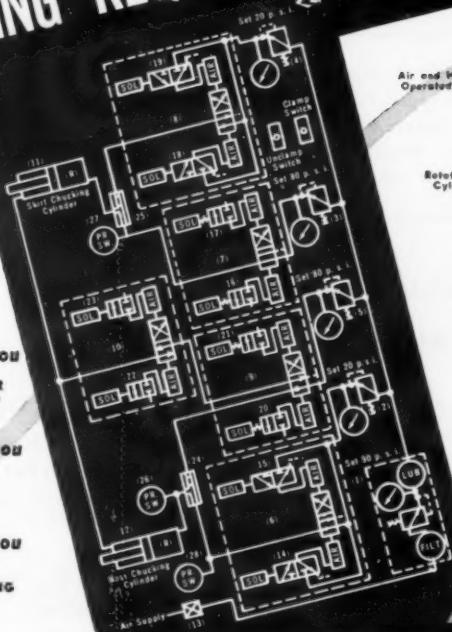


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**TO:**

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

This is a roundup of day-to-day in-plant problems and how they were handled by management men. Each incident is taken from a true-life grievance which went to arbitration. Names of some principals involved have been changed for obvious reasons.

### Can you discharge an employee who does not want a promotion?

#### *What Happened:*

Max Looper wasn't a ball of fire, but for four years he did a fair job. One day Looper was promoted to a job of final inspector—and he was unhappy about it. "This is a pressure job," he told his foreman, "and I'm afraid I can't handle it." The foreman gave no heed to Looper's

anxiety. It soon became evident that Looper's fears were well-founded. In a year he made four costly errors, and he was fired. He protested:

1. I told my foreman I couldn't handle more responsibility.
2. If I didn't make good, I should have been transferred to a job which is "emotionally suitable" for me.

The company came back with these arguments:

1. We are not in the psychiatry business. If a man can't handle responsibility, that's not our fault.
2. We can't retain people who want to stay in a rut. If we did, our business would stagnate.



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performance  
at half  
the cost . . .**

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*Jacobs*  
CHUCK**

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The Jacobs Plain Bearing Chuck for drill presses, portable electric and air tools.



The Jacobs Rubber-Flex® Tap Chuck for tapping heads and impact tools.



The Jacobs Model 96 Collet Chuck for grinding machines, millers and jig-borers.



The Jacobs Ball Bearing Super Chuck for heavy duty and precision industrial use.



The Jacobs Model 91 Spindle Nose Collet Chuck for tool room and engine lathes.



The Jacobs Impact Keyless Chuck especially designed for the aircraft industry.

Was the Company:

RIGHT ☐ WRONG ☐

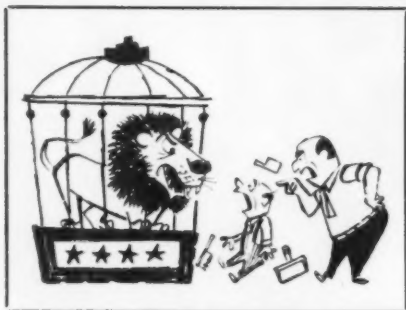
What Arbitrator Langston T. Hawley Ruled:

*"It is the arbitrator's conviction that the pressure under which Looper was working as a final inspector is that to which any employee is subject when he is doing a job he did not want in the first place and for which he is not particularly suited by experience or temperament. Looper's unrefuted testimony reveals that he had*

*certain anxieties about his work as an inspector which help to explain the deficiencies in his performance.*

*"In view of the foregoing circumstances, it is the arbitrator's opinion that the company, instead of discharging the grievant, should have made a greater effort to transfer him before permitting his work errors as an inspector to become so numerous. Certainly the mutual interests of the parties would have been better served by transferring Looper to more suitable work. Accordingly, it is the arbitrator's judgment that Looper should be reinstated by the company."*

## When is refusal to do a job not a cause for discharge?



### What Happened:

The one thing that Leonard Calvin didn't like about his job was the cleanup. He was a laborer, and after putting in seven hours on odd jobs, the foreman would come around and tell Calvin to gather up the debris in the department. One day when the foreman ordered him to clean up, Calvin blew his top. "I've taken enough guff from you," he yelled.

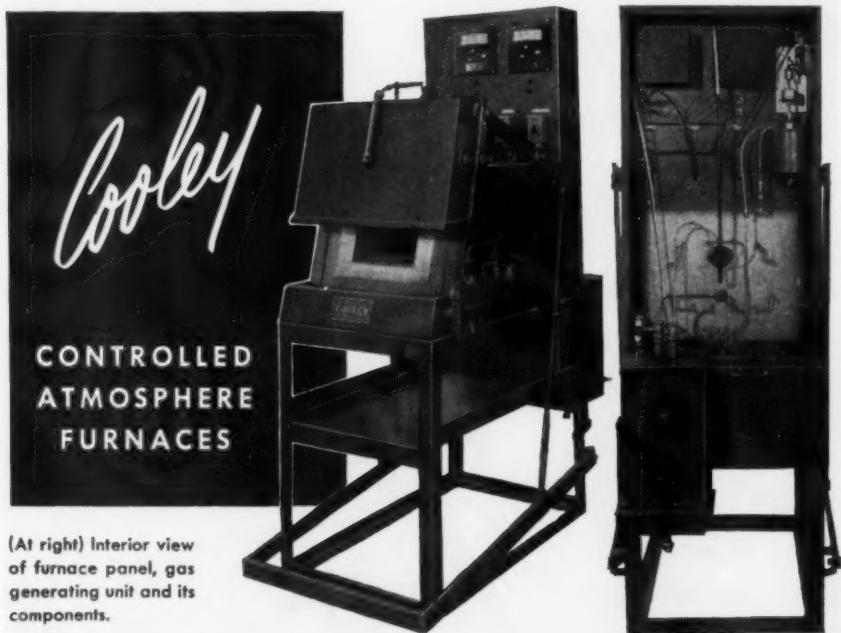
This not being the first time that Calvin talked back to the supervisor, he was promptly fired for insubordination. When he heard the supervisor's verdict, Calvin changed his tune and attitude. "If you tell me what you want done, I'll do it."

"I want you to stay fired, that's what I want you to do," answered the foreman.

Calvin thought the penalty too severe. He claimed that he didn't refuse to do an assignment. And about his talking back, he didn't think it deserved the "death sentence."

The company maintained that the employee's remark was tantamount to refusal to do a job. It said, "no company could long remain in business if its employees accepted certain duties, and then on a day-to-day basis were permitted to decide what work they

## Fully Automatic—Controlled Atmosphere



(At right) Interior view of furnace panel, gas generating unit and its components.

## Tool Room Heat Treating Furnaces

Outstanding advantages—ability to consistently harden tool steels, clean and free from scale, with minimum attention from the operator—initial equipment low cost—moderate operating expense.

The atmosphere used in these furnaces is produced from alcohol and water which, when cracked at a constant temperature, produce gases of constant analysis. Research tables provide data for alcohol-water proportions and cracking temperatures for most commonly used steels. No further metallurgical information is needed. Two sizes—10" x 8" x 18" and 8" x 6" x 14"—for operation to 2000° F.

Catalog and complete information will be gladly furnished on request.

**COOLEY ELECTRIC MANUFACTURING CORPORATION**

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Circle No. 298 on Card, Opposite Page 65

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If you need parts like these in quantity, The American Brass Company can save you time and money. Through its specialized experience—and thousands of stock tools—it may save tool charges, too.

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MULTIPLE-PLUNGER PRESS PRODUCTS

Circle No. 299 on Card, Opposite Page 65

would do and what work they would refuse." If he felt he was being put upon by his foreman, Calvin should have used the grievance machinery.

Was the Company:


RIGHT ☐ WRONG ☐

What Arbitrator Joseph M. Klamon  
Ruled:

*"Leonard Calvin has not shown the proper spirit toward his work or his supervisor. It was also testified to that the foreman had had a good deal of difficulty with several employees, who felt a certain resentment toward the foreman for the hostile or sharp manner in which he often spoke."*

*"Apparently this attitude seemed to provoke a similar type of response. This may explain, but never excuses or justi-*

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**ABRASIVES DIVISION, DEPT. K**

**ELGIN NATIONAL WATCH COMPANY**  
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fies the words of Calvin, or his reluctance to do clean-up work. It is his clear duty to follow the orders of his supervisors and never to be insubordinate or profane; and then if he has any just cause to complain, to invoke the grievance procedure of the contract which must faithfully be respected at all times.

"It is of paramount importance that the rights of management must never be impaired, and the contract must be lived up to when the provocation to do otherwise is greatest.

"However, the discharge for refusal to do work as ordered cannot be sustained as it is not clear at all that such alleged refusal to do ordered work was even intended by Calvin. He did express sullen resentment at being directed to do clean-up work. When the foreman discharged him for the profanity, then Calvin repeated, as stated, 'If you will tell me what you want done, I will do it.' I order reinstatement without back pay."

### **Can you fire an employee for defending himself in a fist fight on company property?**



#### *What Happened:*

Sam Edon worked in the shipping department. When a company truck backed into the loading platform, Edon yelled: "Hey, you mug, you can't park there."

The driver, Jim Forrest, took this as an insult and jumped out, fists flying. Edon, who was no powder puff, took up the challenge. The fight lasted for over 15 minutes,

with both men slugging it out. They threw not only fists, but hammers, boxes, and chains. It was a real battle—Hollywood style. Edon won, but his reward was a discharge notice. Forrest got one, too. Edon protested: "I didn't start the fight—I simply defended myself."

The company agreed that this was so, but maintained that it was Edon's duty to fend off Forrest's blows and not to indulge in a lengthy battle, using company equipment as ammunition.

Was the Company:

RIGHT ☐ WRONG ☐

What Arbitrator Marion Beatty Ruled:

"If I were satisfied that Edon was an unwilling participant trying to disengage himself, and returned just enough blows to protect himself I would probably hold for him. I am inclined to agree with his position that it should not be necessary for him to 'take a dive' or 'run like a

**AVOID** the  
**HIGH COST**  
and difficulty  
of fabricating  
long, hard  
& straight parts  
by conventional  
methods . . .

THOMSON

60 Case

# hardened and ground

*SHAFTS, ROLLS, GUIDE RODS and other long-round parts*

60 Case is the result of over ten years of experimental work and production experience with hardened and ground shafts which are a requirement for BALL BUSHINGS, the Linear Ball Bearing manufactured by Thomson Industries, Inc.

The special techniques and equipment that have been developed enable high production rates and low handling costs. This permits big savings over conventional methods which are plagued with erratic warpage, straightening and resultant grinding problems. Finished 60 Case parts frequently cost less than the scrap losses that result from conventional methods.

60 Case material has a surface hardness close to 60 on the Rockwell C scale which is essential to resist wear.

Long lengths of material ranging in diameter from 1/4" to 4" are stocked to enable prompt shipment of 60 Case parts, with or without special machining.

## ADVANTAGES of 60 Case

- COST REDUCTION
- HARD BEARING SURFACE
- ACCURATE DIAMETERS
- GROUND FINISH
- STRAIGHT PARTS
- DELIVERY FROM STOCK
- ADDED STRENGTH
- UNIFORM HIGH QUALITY

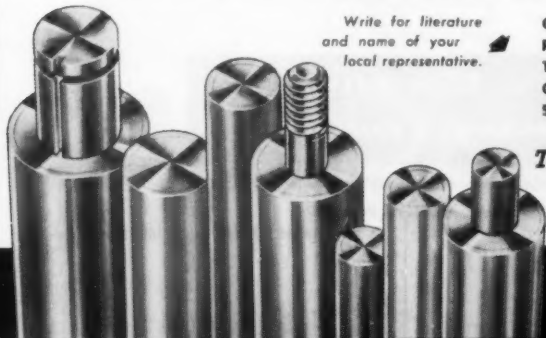
## TYPICAL 60 Case PARTS

GUIDE RODS, SHAFTING, ROLLS, TRAVERSE  
RAILS, PISTON RODS, ARBORS, LEADER PINS,  
TIE RODS, KING PINS, AXLES, CONTROL RODS,  
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and name of your  
local representative. ➡



rabbit' in order to keep his job.

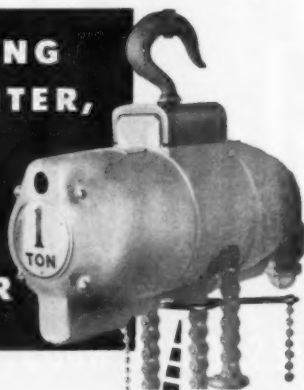
"There were other witnesses to the incident, and by their testimony I am convinced that both men were angry and both were willing participants in a fist fight on company premises for a minimum of 15 minutes. It was a real fight, not just horseplay or any pushing, powder-puff affair.

"I am satisfied that either party could have suspended hostilities in much shorter

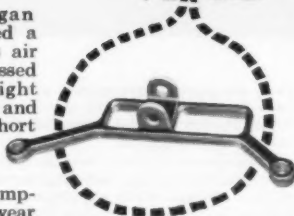
order or 'stepped outside' and off the premises in much less than the 15 minutes, and with fewer blows if either one had not been so angry.

"Every mature person must know that engaging in a violent fist fight on company property is detrimental to the business, can be injurious to property and persons, and that it cannot be condoned. I find that the company had sufficient and just cause for the discharge of Edon."

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PROVES LIGHTER,  
STRONGER,  
CHEAPER,  
FOR  
HOIST MAKER**



A Grand Haven, Michigan manufacturer formerly used a cast control lever on his air hoists. Converting to a pressed steel stamping saved weight without sacrificing strength, and allowed him to order in short run quantities.



Dayton Rogers' small lot stamping service saves money, wear and weight, and improves product usage. Our facilities will handle blanks 22" square; material up to  $\frac{3}{8}$ " thick; and draw operations up to  $4\frac{1}{4}$ " deep.

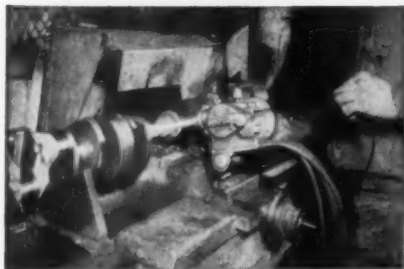
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PLUS QUANTITY, FOR PROMPT QUOTATION**

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*Manufacturing Company*

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Circle No. 301 on Card, Opposite Page 65

# when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.

...and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours. Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. You haven't just salvaged a part—you've improved it.



## Free Bulletin

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.

The trade name, SPRABOND WIRE, is the property of Metallizing Engineering Co., Inc.

DON A. WATSON  
METALLIZING ENGINEERING CO., INC.  
1147 Prospect Ave., Westbury, Long Island, N. Y.

- ☐ Please send me Bulletin 57-C.  
☐ Please have Metco Field Engineer call.

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



## Metallizing Engineering Co., Inc.

1147 Prospect Ave., Westbury, L. I., New York • cable: METCO  
In Great Britain:  
METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England

Circle No. 302 on Card, Opposite Page 65

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**X** Multiply the use of your surface grinder. . .

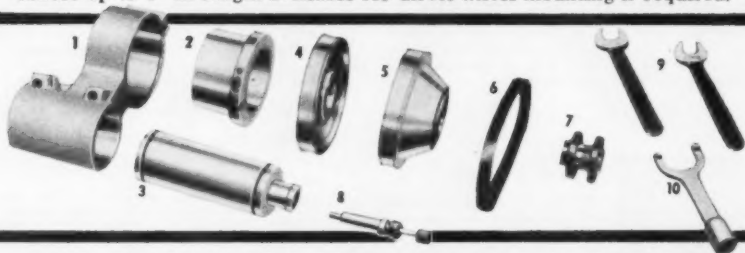
**+ Add a *Whitnon***  
**HIGH SPEED ATTACHMENT**

---



Most 6x18 surface grinders can now be used to finish small radii on dies or parts requiring small contour grinding by merely adding a Whitnon high speed surface grinder attachment. This assembly, in effect, creates an extra machine at little cost and increases the production range of your present grinder.

Whitnon surface grinder attachment comes as a complete kit, and can be shipped in a fitted wooden case. The offset pulley No. 5 makes it possible to reach into deeper holes and recesses than the flat pulley. Tapered arbors up to 4" in length available for direct wheel mounting if required.



1. Bracket 2. Eccentric bushing 3. 20,000 RPM grease lubricated spindle 4. Flat pulley 5. Offset pulley 6. Belt 7. Wheel & pulley mount 8. Collet type arbor 9. Arbor wrenches 10. Wheel & wheel mount wrench

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**THE *Whitnon* MANUFACTURING COMPANY**  
ROUTE 6 AND NEW BRITAIN AVE., FARMINGTON, CONNECTICUT

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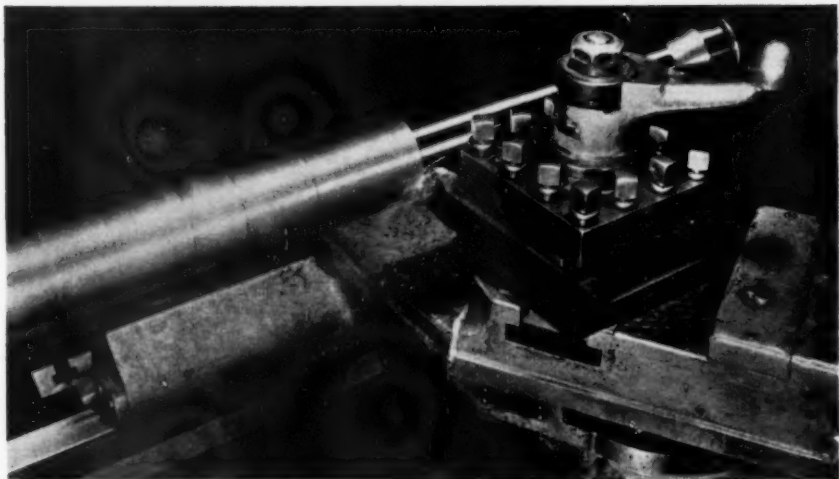
Circle No. 303 on Card, Opposite Page 65

## FIELD REPORTS OF EQUIPMENT IN ACTION

MACHINE AND TOOL

blue book

### Ups Production 100% with Ceramic Tools



**FINISH TURNING OPERATION** at R. K. LeBlond showing new Carboloy grade 0-30 cemented oxide tool cutting at 715 fpm. Twelve-step finish turning time on each spindle was reduced from 6 to 2.8 minutes.

**STEPPED-UP MACHINE SPEEDS** through the use of cemented oxide in finish turning 31-inch lathe spindles recently enabled R. K. LeBlond Machine Tool Co., Cincinnati, to both improve work finishes and increase production over 100 per cent.

**CINCINNATI**—The time cycle for all steps required to finish each spindle—minus loading time—was reduced to 2.8 minutes under actual production

conditions at LeBlond. Under previous conditions with carbide as the cutting tool, the cut took 6 minutes. Currently, the work is being turned at 715 fpm.

The job at LeBlond calls for making a 12-step cut with only one cutting tool along 29 inches of the 31-inch spindle. The latter is  $3\frac{1}{2}$  inches diameter stepped down to  $2\frac{3}{8}$  inches at the opposite end. The nose end of the spindle

## Field Reports

continued

is not involved at this stage of machining.

Prior to finishing, the spindles are first roughed out on a 16-inch tracer-controlled engine lathe to leave a constant depth of stock between 1/64 to 1/32-inch. The finishing operation takes place on the same type of lathe after all spindles at hand are roughed out at a feed of 0.0125-inch.

With carbide, the finishing operation was run at a machine speed of 350 fpm. Following a run of 20 spindles it was necessary to change the carbide tool for resharping.

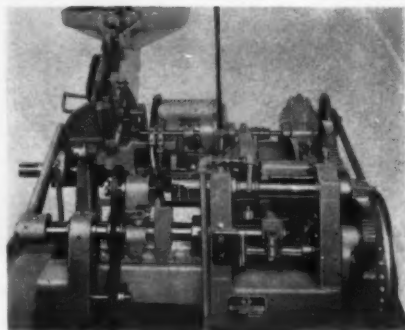
Application of the new Carboloy 0-30 cemented oxide tool with proper geometries boosted the machine output to 29 spindles before resharping was necessary, finish turning each spindle in less than half the time. Size variation from spindle to spindle in each run of 29 varied only about 0.001-inch without touching the setup.

## Multiple Operation Machine for Locking Cam Studs

Special camshaft for Townsend Milling machine permits automatic production of over 750 studs per hour.

HARTFORD, CONN.—The problem of mass producing a precision Locking Cam Stud fastener for hinged or removable covers on aircraft was recently solved by H. P. Townsend Mfg. Co. of Hartford. To insure positive locking under constant vibration it was necessary to keep the cam form, end slot, and cam release in precise relation to each other. Specifications called for heat treated steel blanks, with each piece individually milled. The average operator produced a finished piece every sixty seconds, under former methods used for the job.

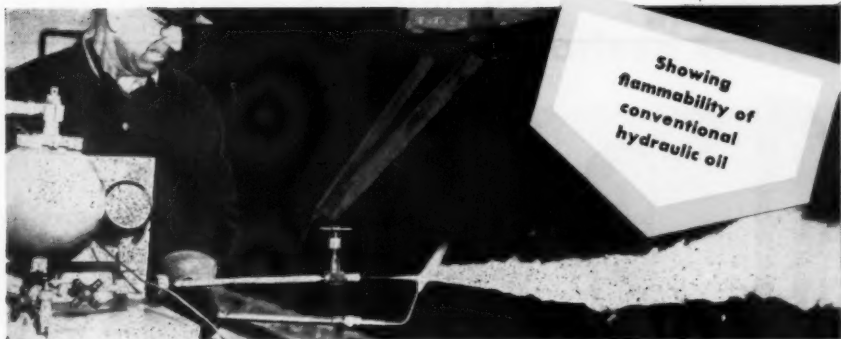
Using four Townsend automatic secondary operation machines, the sequence of side turning, milling the cam form, milling the end slot, and finishing the end mill cam release is done



Multiple-operation machine recently built by Townsend of Hartford automatically performs four secondary operations on precision aircraft stud fasteners.

at an average sustained production rate of 10 to 12 pieces per minute. The operation requires only loading of the hoppers and replacement of cutting tools by the operator. High-speed steel cutters require replacement every 30 minutes. A standard cutting oil is used as the coolant.





Showing  
flammability of  
conventional  
hydraulic oil

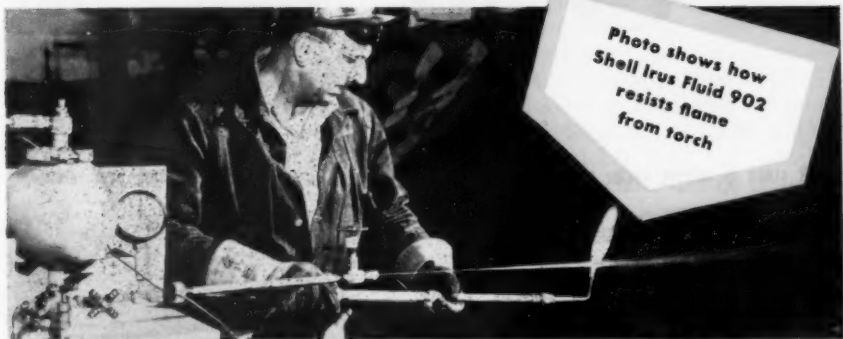


Photo shows how  
Shell Iru Fluid 902  
resists flame  
from torch

## Flame tests prove its fire-snuffing ability

**Entirely new formula:** Shell Iru Fluid 902 is a special formulation . . . product of three years' development and field testing. It is suitable for nearly all industrial hydraulic systems, as a direct replacement for presently used oils. *Here is a fire-resistant hydraulic fluid that can be widely used.*

**Non-corrosive:** Shell Iru Fluid 902 contains no corrosive ingredients. It has

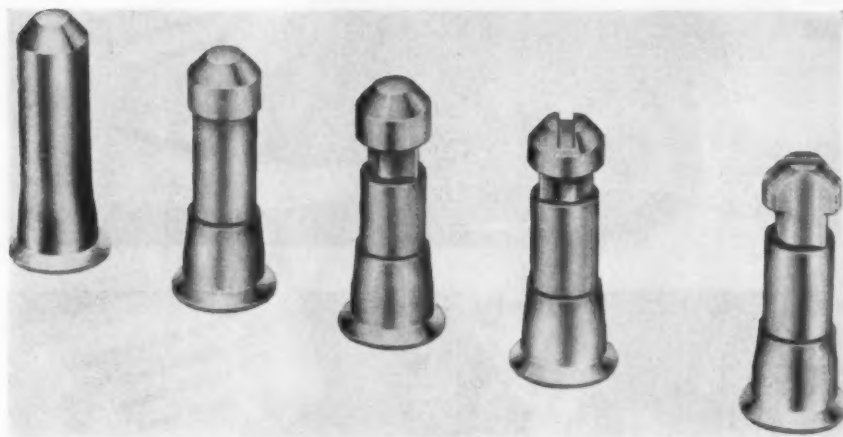
no harmful effects on seals, fittings or bearings. It does not promote rust.

**No major modification necessary . . .** simply clean present fluid thoroughly out of system and replace directly with Shell Iru Fluid 902. You can use it with complete confidence. *Write for test data and all information to*

**SHELL OIL COMPANY**  
50 West 50th St., New York 20, New York  
or 100 Bush St., San Francisco 6, California

# SHELL IRUS FLUID 902





FOUR steps in milling cycle: sideturning, milling cam form, milling end slot, finishing cam release.

The hopper blade automatically feeds parts into a track, a pick-off finger mechanism removes the stud which is then chucked, supported by a steady rest. The specific steps and sequences are activated by the camshaft.

With a 30-minute cutting tool replacement cycle rejects are practically nil, and the machines hold all finished parts within .001. • • •

### More Cuts Per Grind

Cast iron leveling wedges for Baldwin-Lima-Hamilton plate glass polishing machines require an endmill sizing cut to produce a finished slot 1-3/4" deep and 4" long.

Formerly, these slotting cuts were made with high speed steel cutters on a 10 h.p. Cincinnati Hydrotel, with spindle speed of 192 r.p.m. Table feed was two inches-per-minute, and they were able to get four cuts per grind.

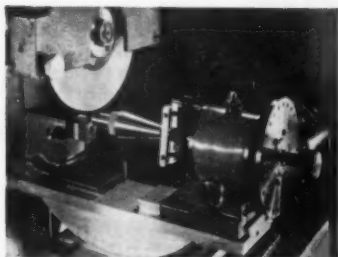
B-L-H tool engineers investigated the use of "Helicarb" helical carbide end mills. According to D. Rumpler, Superintendent, use of "Helicarb" end mills permitted them to increase spindle speed to 550 r.p.m. and table feed to 8" per minute. They are now getting 160 slots per grind. • • •



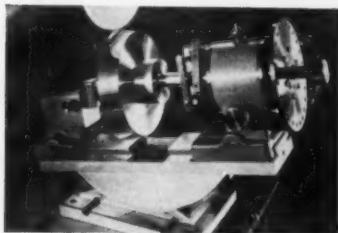
Cutters used for the slotting cut are ENH-112 end mills with 2" flutes and 1" shanks.

## Save on small grinding jobs with Moore Motorized Centers

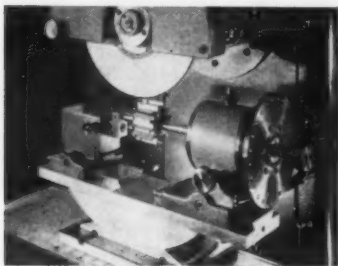
Toolroom attachment for surface grinders, jig borers, drill presses, millers, etc., handles flat, curved or circular work in one setting.



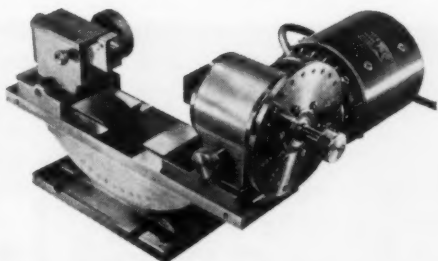
Double tapers and hex shoulder ground with a single setup.



Grinding a 10° taper on a machine part 5" long, 5" in diameter on centers.



12 equally-spaced slots in punch holder ground by using index plate.



You no longer need to tie up large machines on grinding square and round punches ... doing taper grinding, index grinding and face-plate work. Moore Motorized Centers, a portable, precision-built accessory, can be set on a surface grinder chuck in a jiffy and the job completed quicker than the grinding wheel on a large machine can be changed. You'll save on toolroom labor and materials.

With Motorized Centers, in one setting, you can grind flat, curved or circular work—in any combination of taper or contour—all within .0005". The index plate allows indexing in the same operation, too. Tapers can be reversed or changed by loosening two screws in the rocking bed, and the index plate can be engaged by merely pressing a plunger. The simple tail-stock center readily permits the use of specials—male, female or cutaway.

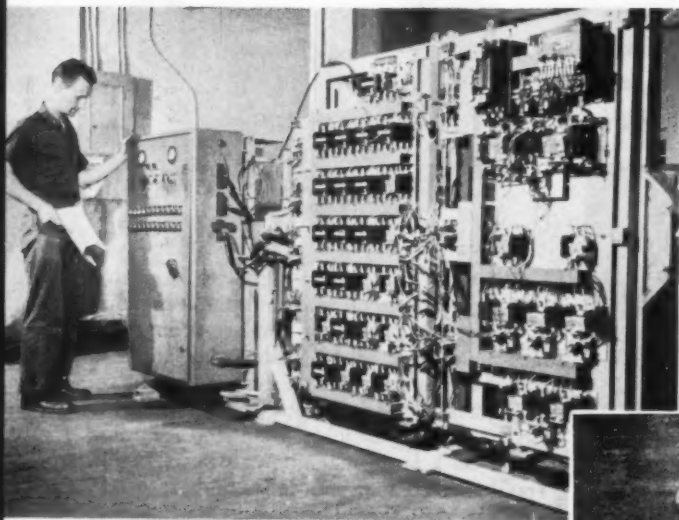
**Catalog with 20 Action Photos** shows many toolroom jobs you can handle with this versatile tool. Write for a copy today.

### SPECIFICATIONS

Length—overall . . . . .	12"
Width—including motor . . . . .	10"
Height—overall . . . . .	8"
Distance between centers—maximum . . . . .	6"
Centers will swing . . . . .	6"
Max. grinding angle (using 10° angle block) . . . . .	30°
Motor . . . . .	1/25 H.P., 115 volt, 60 cycle
Work Speeds . . . . .	110-220-440 R.P.M.

**Moore Special Tool Company, Inc.**

728 Union Avenue, Bridgeport 7, Conn.

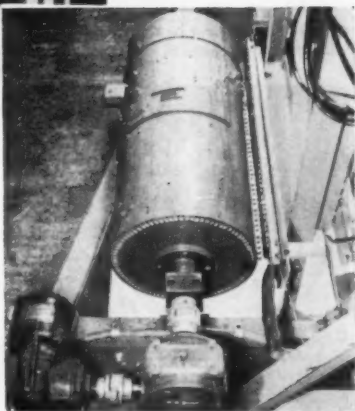


**AUTOMATIC** machine tool electrical control panel testing device in use at The Warner & Swasey Company, Cleveland. Panel mounting rack (right) holds motor control and cycle control panels under test. Signal lights on test center cabinet (left) indicate any detected faults in individual panel circuits.

### Automatic Panel Tester Verifies Machine Tool Wiring Circuits

● The testing of machine tool electrical control panel wiring is now verified automatically by a new testing device in just slightly over two minutes time at Warner & Swasey Co., Cleveland.

The new testing device consists of three major elements: a rack on which the control panels to be tested are mounted; a motor-driven cam drum operating a series of electrical switches; and a test center cabinet incorporating operating controls and signal lights,



**ROTATING CAM DRUM** is of hardwood construction and is driven through reduction gearing by a 1/6 H.P. electric motor. As drum rotates, its cams actuate in sequence the series of electrical switches (to right of drum) which set up relay circuits simulating actual operation of the machine tool.

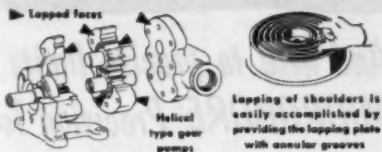
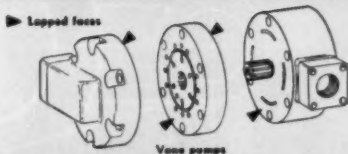
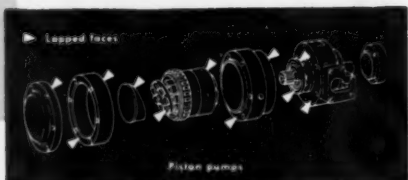
plus auxiliary relays and starters which supplement the action of the cam-actuated electrical switches. ● ● ●

## How Pump Manufacturers Use the

# Lapmaster<sup>®</sup> To Improve Product Performance

Like valve manufacturers, a large number of pump manufacturers need precision flatness and finish in order to insure efficient product performance. They're getting *both* flatness and finish plus parallelity in production quantities with Lapmasters. Photos at right illustrate a few typical parts being machined daily.

The high production accuracy of the Lapmaster (micro-inch finishes of 2 to 3 RMS—surface flatness to less than .000011" when required) is being achieved on all materials including cast iron, steel, stainless steel, magnesium, aluminum, brass, carbon, ceramics, plastics and sintered metals. It will pay you to investigate this modern precision, yet economical, method of machining.



\*Protected by U.S. and Foreign Patents



### FREE TECHNICAL DATA

These three booklets will give you the facts on producing and measuring precision flatness and finish. Write for your copies today.



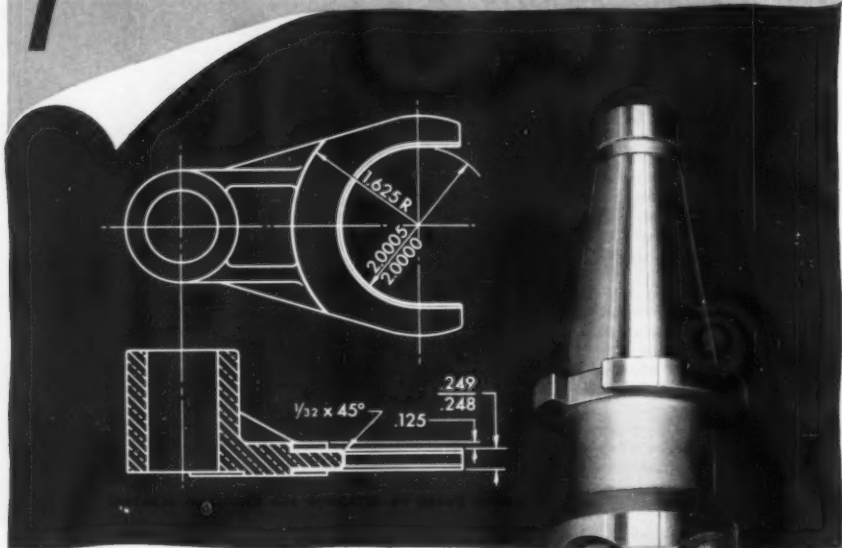
Crane Packing Company  
Oakton St., Morton Grove, Ill.  
(Chicago Suburb)  
In Canada: Crane Packing Co., Ltd.,  
Hamilton, Ont.



## CRANE PACKING COMPANY

Circle No. 306 on Card, Opposite Page 65

# 7 SURFACES on SHIFTER FORK MACHINED AT 1 PASS!



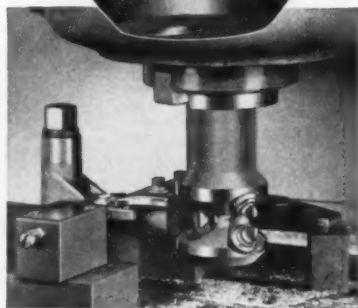
## And held to precise limits by using MICROBORE® Precision Tooling-

Illustration shows setup for completely machining shifter forks on standard Vertical Milling Machine to precise limits of accuracy on a production basis.

This application of Microbore Cluster Tooling permits use of simple low-cost work holding fixture, and substantially reduces tool costs per piece.

Write for Illustrated Catalog . . .

*Microbore®*  
PRECISION TOOLING



DEVLIEG MICROBORE  
DIVISION OF DEVLIEG MACHINE COMPANY

2720 West Fourteen Mile Rd. • Royal Oak, Michigan

Circle No. 307 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

### One Die to Pierce, Trim and Extrude

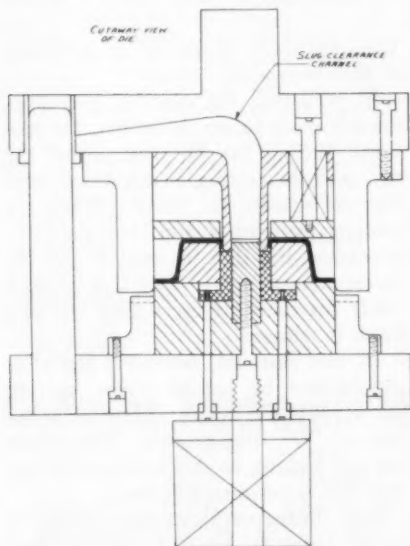
by Ernest W. Pochervina

Many dollars are wasted in production by having two or three dies to pierce, extrude, and trim parts. By building a die as shown in sketches A-B-C these three operations can all be done at once.

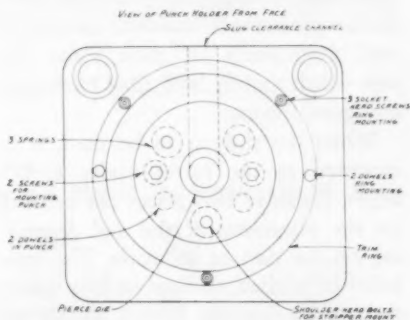
The secret to this is—making the pierced slug travel through punch of

die. Piercing punch must travel deep enough into die so that slug enters taper, then slug will be retained in die. Slug clearance channel (sketch B) must be smooth so as not to hang up slug. This type of die must be operated in an inclined press, with an air jet attachment to blow piece off pilot (sketch C) just before completion of press stroke. Air jet attachment being cam operated from crank shaft of press, which can be timed so as not to be blowing when operator is placing part on pilot.

Scrap cutters are placed in front and back of die, rather than one on



Sketch A.



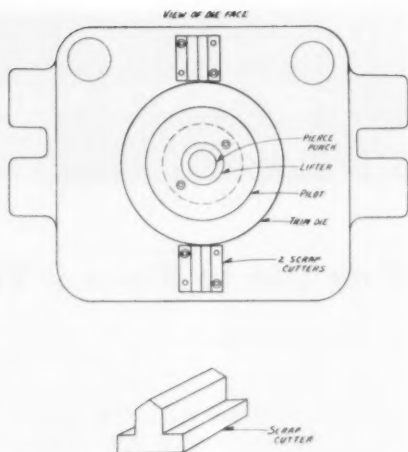
Sketch B.



## Shop Hints

continued

each side because—when they are placed on each side the scrap when being cut by trim ring will fly and hit operator; being front and back this problem is solved. In determining height of scrap cutters you must take into consideration the depth trim ring will travel when die is at sheet height. You should not cut scrap ring until after second piece has been trimmed, then scrap cutters will sever first scrap ring. The process of the working parts of the die, to piece, trim and extrude in one die operation are self explanatory by following sketches A-B-C. •



Sketch C.

## Profile Turning Slide

By S. R. Rosen

The profile turning slide was originally designed for the specific job for single point cutting of a ball seat. Once that job was completed, other uses were sought for the tool and since then it has had broad application in the U.S. Automatic Corp. plant. Now regarded at the plant as a standard tool, it is used particularly for those short run jobs which require both close tolerances and good finishes.

When the slide is to be used, it is mounted in the turret under a 45° angle. Either of two places can be used for the placement of the tool depending on the part to be made. The cam follower is then screwed in the upper slide which is spring loaded; the downward travel is limited by two stop nuts.

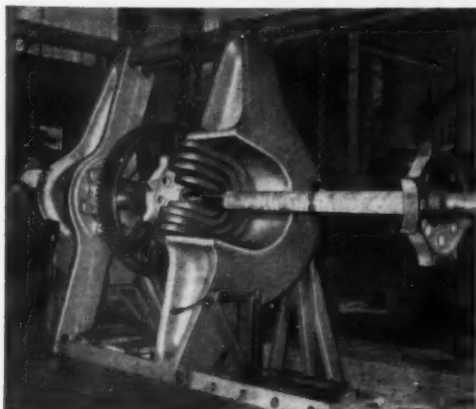
The cam itself is secured in a fixture of the cross-slide.

In preparing the unit for operation, the job must be set up so that the tool starts cutting on the bottom of the part and the cutting is continued until the tool reaches the center. When the center is reached, a stop knob halts the operation, the slide is locked, and the turret moved away. The tool is then ready for the next cycle after the stop knob is released.

In one instance, however, the slide should not be locked while moving away with the turret. This is in the case of "O" ring grooves. The reason for not locking in this instance, is that the slide is permitted to lower.

One distinctive difference should be noted between internal and external profile turning. In the case of the

# A MOUNTAIN *of* POWER



**POWER FOR BIG JOBS**—Here a Rodgers 600-Ton Inclined Forcing Press is forcing a large gear and sprocket from a mine machine shaft.

—or a touch  
of pressure

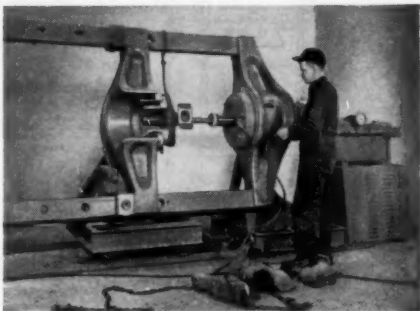
The heavy machines and equipment used in the great iron mining industry present a variety of problems when repair or maintenance is necessary. For this work the accurately controlled action of Rodgers Hydraulic Forcing Presses is a real time and work saver.

A Rodgers Forcing Press puts a mountain of power at your fingertips to force wheels, sprockets or gears from their shafts and for straightening, assembling, swedging or upsetting jobs. Operators also use the versatility, speed, power and positive control of a Rodgers Forcing Press to efficiently perform small pressing and forcing jobs with just a touch of pressure—tasks once done only on vertical shop presses!

## *you get both* with **RODGERS FORCING PRESSES**

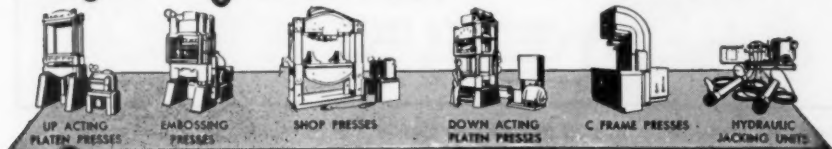
Rodgers vertical, horizontal and inclined forcing presses offer capacities from 100 to 600 tons . . . up to 9 feet between tension bars . . . up to 16 feet between ram and abutment . . . single or double acting cylinders with 13 or 26-inch ram travel (72-inch travel available) . . . electrically powered hydraulic pumps with selective, positive pressure adjustment and remote control . . . removable press cylinders that can be used in special jacking or pulling jobs . . . and many more features that assure you of dependable, long life operation—all fully described in Rodgers Catalog Number 315A.

**Write for it today!**



**LIGHT TOUCH FOR SMALL JOBS**—This Rodgers 300-Ton Inclined Forcing Press is used on small as well as large equipment repairs. Here, a pin is being pressed out of a tractor idler support bracket.

**Rodgers Hydraulic Inc.** 7453 Walker St., Minneapolis 26, Minn.



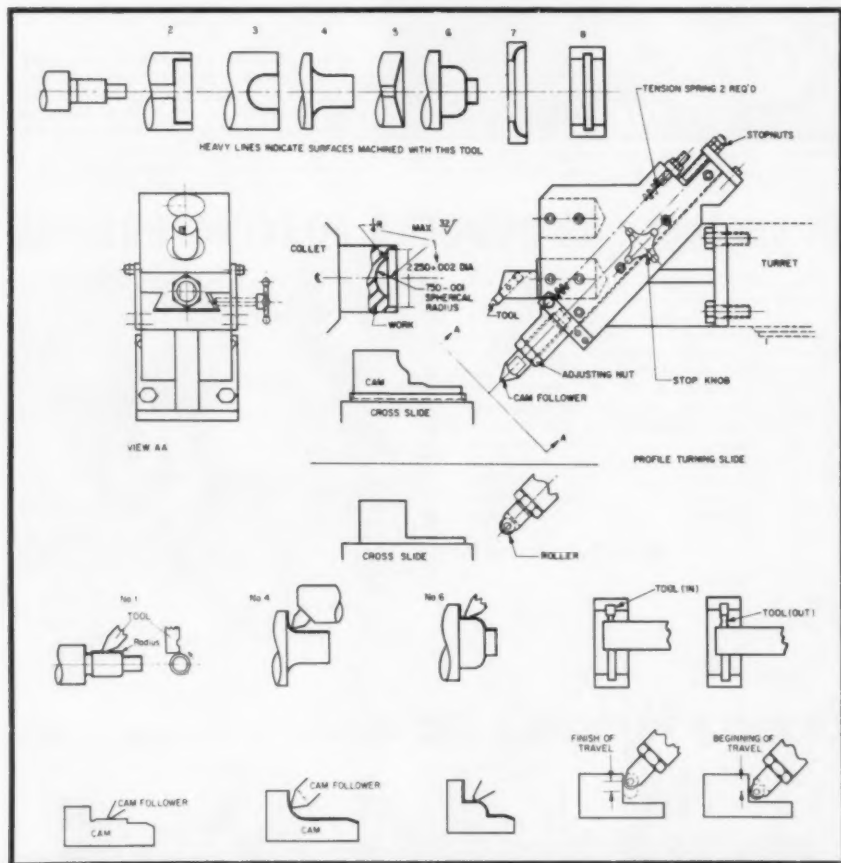
Circle No. 308 on Card, Opposite Page 65

former, the cam confirms the outlines of the internal profile, and the tool is set in a boring bar just as a regular boring tool would be. However, in the case of external profile turning, the cutting tool is similar to a knee tool and the cam corresponds to the profile of the upper portion of the work.

The cam, in the case of grooving, consists only of a straight vertical block. This is illustrated in the drawings representing

two different views, the beginning of the travel and the finish of the travel for internal grooves. It can be noted from the drawings that while backing up the hex turret, the grooving tool clears down to the end of the preset slide limit and then moves out.

The various types of work that are possible with the profile turning slide are also illustrated in the series of drawings.

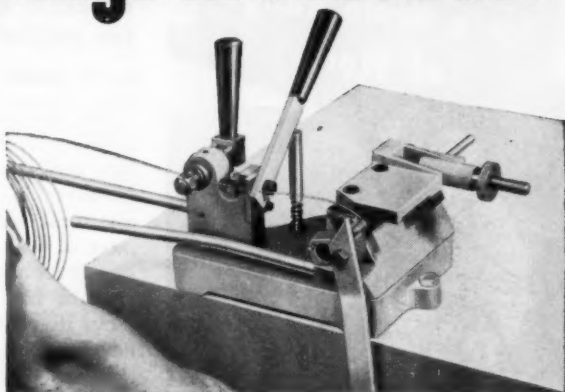


Illustrated are the various types of work that are possible with the profile turning slide.

# Make springs in seconds!

*Save  
costly  
special  
orders*

WITH THE  
**NEW**



## **DI-ACRO\*** Spring Winder!

This unique machine eliminates costly special spring orders, saves valuable waiting time. Winds flat, torsion, compression and extension springs to  $1\frac{1}{2}$ " O.D. Handles round, flat and rectangular wire to  $\frac{1}{8}$ " dimension. Note exclusive features in the hand operated Di-Acro Spring Winder which assure accurate tension and fast operation without special experience or skill.

**NEW TENSION CONTROL**—Simply adjust to desired tension—the control keeps it uniform, for winding one spring or hundreds, and releases when each spring is wound.

**NEW WIRE CUT-OFF DEVICE**—After spring is wound, release tension and use cut-off lever to quickly cut spring to desired length.

**NEW CAM LOCK**—Simply feed wire under cam, turn handle and wire is securely locked to arbor while spring is wound. No threading required.

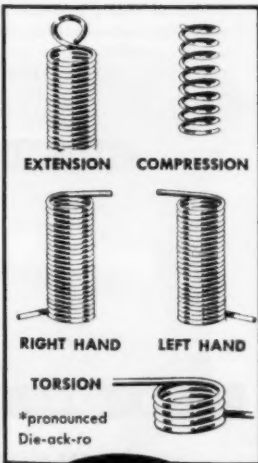
### **Free Engineering Service**

Send us your spring forming problems—samples or dimension sketches—together with sufficient test material, and let us wind some sample springs for you free of charge. No obligation.

**32-Page Catalog** gives complete details on all Di-Acro Precision Machines. Consult the yellow pages of your phone book for the name of your nearest Di-Acro distributor or write:

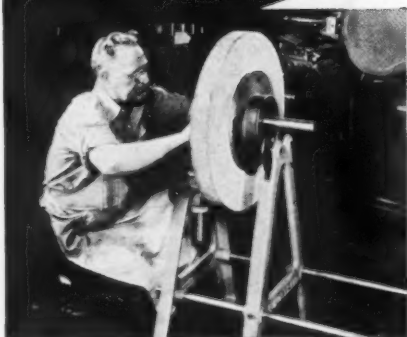


O'NEIL-IRWIN MFG. CO. • 314 8th Ave. • Lake City, Minn.



**di-acro**  
PRECISION  
METALWORKING  
MACHINES

## Balancing Tools for a Wide Range of Work



Here's a complete line of Balancing Tools which will save their cost quickly on balancing or truing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. The standard sizes available are shown in capacity chart below.

### CAPACITIES

Swing	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

### FREE DATA



You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin 474.



**SUNDSTRAND MACHINE TOOL CO.**  
2535 Eleventh Street, Rockford, Ill., U.S.A.

Circle No. 310 on Card, Opposite Page 63

## Shop Hints

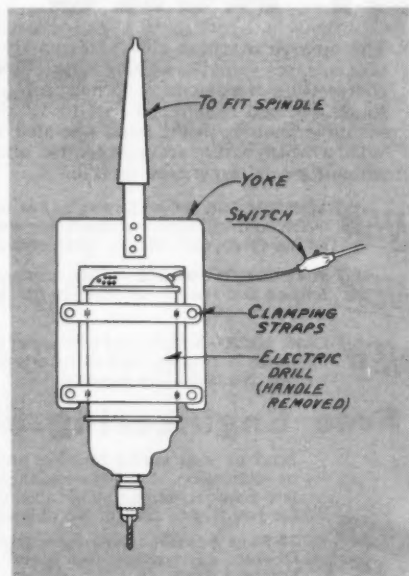
continued

### Electric drill attachment for radial drill

By H. Koslow

We have a number of large radial drills in use in our plant, and in general they are used for drilling large holes. However, we frequently find that we also must drill small holes on the same piece of work. The radial drill's spindle speeds are too slow for the small drills and the feed is too coarse. We could move the work to a smaller drill press but this would be time consuming.

We were drilling the small holes on the big machine, feeding the drill carefully by hand. In order to speed up



UNIT BUILT AROUND an electric drill for small hole drilling without moving workpiece to a smaller machine.

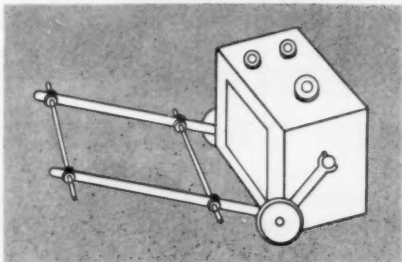
this work we made up a unit built around an electric drill as shown in the illustration.

When small holes are to be drilled we slip this unit into the taper socket and turn on the power on the electric drill. To keep the spindle from rotating, the drive gears are engaged but the motor is not turned on. The hand feed is used to feed the drill into the work. We used a  $\frac{3}{8}$ " capacity drill for this application but the drill can be selected to suit the job.

We have found this arrangement very useful and some of the men use it for spotting holes with a center drill prior to drilling. We mounted the drill so the drill chuck was right in line with the taper shank. In this way the electric drill can be used for spotting holes and then they can be drilled with the main spindle without shifting the head. •

## Dolly for handling radial drill jigs

By Ernest Jones



We have a number of radial drills in our shop and do a lot of drilling on short runs of castings. We have jigs for all these castings and spend a lot of time moving them in and out of the machines.

To facilitate this handling we made up a little two wheel device as shown

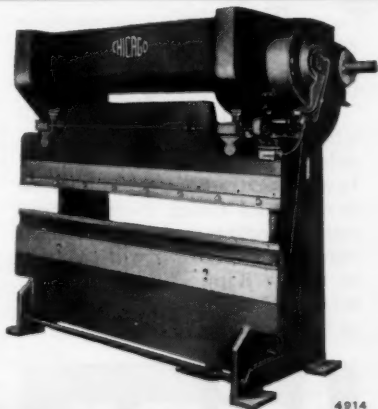


## STEEL PRESS BRAKES

### 43 Standard Sizes

Readily adapted for a wide variety of bending, forming drawing, notching, blanking, punching, embossing, etc.

**DIES** Complete Line of Induction  
Hardened Dies for All Makes  
Sizes of PRESS BRAKES.



4914

# DREIS & KRUMP

MANUFACTURING COMPANY

7440 S. Loomis Boulevard, Chicago 36, Illinois





**HIGHER SPEEDS!  
FASTER GRINDING!**

**kipp**

## AIR GRINDERS

MODEL JA  
50,000 R.P.M.

**\$42<sup>00</sup>**

IN U.S.A.



Weight 12 ounces;  
length 6 3/4 inches;  
chuck size 1/8 inch.  
Wheel guard removed  
for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

**kipp**

**MADISON-KIPP CORP.**

207 Waubesa St., Madison 10, Wis., U.S.A.

Circle No. 312 on Card, Opposite Page 65

162

## Shop Hints

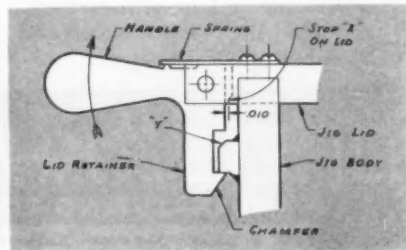
continued

in the drawing. Each jig has a short stud on each end. We use this dolly for moving the jigs and also when turning the jigs. Some of them must be turned so holes can be drilled in the sides or bottom. For jigs of this type the studs are mounted near the center of gravity of the loaded jig. The two wheel dolly is constructed so the width is adjustable. The forks on the dolly are slipped under the studs and the jig is lifted by applying pressure on the handle.

### Novel lid retainer

By **Cliff Bossmann**

Shown in the illustration is an example of a very simple, yet effective lid retainer. When the lid is up, the lid retainer contacts stop "X" on the lid, the retainer being held against the stop by the action of a flat spring. When the lid is lowered into place, the chamfer on the lid retainer contacts surface "Y" on the jig body which pivots the retainer around its mounting dowel. The retainer eventually assumes the position shown in the illustration being held in this position by the spring as shown. The lid is released and raised simply by moving the handle of the retainer in the direction of the arrow.



MACHINE and TOOL BLUE BOOK





*switch*  
**A ~~STITCH~~ IN TIME . . .**

If you are trying to patch up holes in your production schedule, then it's high time that you switched to CIMCOOL®, the world's largest selling chemical cutting fluid. Here's how CIMCOOL Standard Concentrate can save you money and increase your production.

- **CIMCOOL INCREASES TOOL LIFE** (thus reducing downtime) through its chemical lubricity.
- **FASTER SPEEDS** and feeds are possible because CIMCOOL cools faster, for it combines friction reduction and cooling capacity in a degree never before attained.
- **CIMCOOL COSTS LESS** than old-fashioned cutting fluids because it lasts longer. It also cuts labor costs for cleaning and changing. It virtually eliminates rancidity and foul odors. Because of its low surface tension and low adhesion to work and chips, there is practically no carry off. And CIMCOOL is *clean*—leaves no slippery film on hands, work or floor.

Consult your CIMCOOL distributor. Or contact us direct. Wire, write or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

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**CIMCOOL CUTTING FLUIDS**

**CIMCOOL Concentrate**—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

**CIMCOOL Tapping Compound**—Permits the use of highest tapping speeds and increases tap life amazingly.

**CIMPLUS**—The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

**CIMCUT Base Additive**—For jobs requiring an oil-base cutting fluid. Added to mineral oils, it gives an economical mix for higher speeds and feeds.

**CIMCOOL Bactericide**—The most effective agent yet developed to overcome rancidity and foul odors.

**CIMCOOL Machine Cleaner**—The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

CIMCOOL

Cutting Fluids

for 100% of all metal cutting jobs

PRODUCTION-PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.



1—PRESS SETUP EMPLOYED to sever oblong tubes for Chevrolet frame side rails. A horizontal tool is cammed across to make the initial cut. Then a vertical tool on the ram shears the two side walls and the bottom wall.

*How Chevrolet Solved Problem of*

## **Tube Cutting**

*. . . without producing interior burrs*

By **Herbert Chase, M.E.**  
Consultant

● Production of the new Chevrolet frame for passenger cars at the Chevrolet-Flint Manufacturing Division of General Motors involves making, for each side rail, two

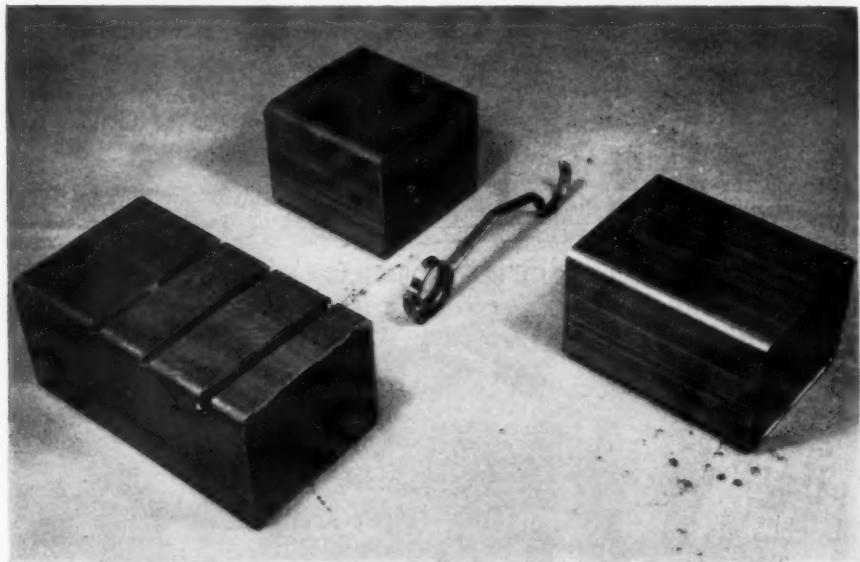
lengths of seam welded tubing of oblong section, the tube being produced in a continuous mill. Initially, these tubes are cut to double length with a flying cut-off saw that produces burrs around part of the inner diameter.

Before the double lengths can be used, they have to be cut in half and it was found that an interior burr in this cut gave trouble with mandrels inserted when the ends of the tubes are bent to the shape that the frame design requires. To avoid the interior burr, the following method of making the severing cut in a press was devised:

Double lengths are fed into a

track that extends across the bed of a No. 74½ Bliss press. Then the tube is clamped, as in Fig. 1, so that the center is opposite the cutting blades of which there is one that is cammed in horizontally and one carried on the ram of the press moving vertically. For the initial cut there is a narrow and somewhat chisel shaped tool whose point enters the side of the tube slightly below the inner face of the top wall.

*As the cut is made across this wall the tool rolls up a chip of a width equal to the tool width, the shear being outward so that any burr is on the outer face.*



2—SHORT LENGTHS OF TUBE that have been sheared in the Figure 1 setup, and the chip produced in making the cut. At the left is a tube in which three horizontal cuts have been made. All burrs are thrown outward.

## Tube Cutting

continued

As soon as this cut is completed, the upper tool enters the slot cut in the top wall. This tool has a V-shaped edge, and, at the top at each side of the V, there is a radius whose cutting edges shear the side walls rolling chips outward in the direction of the shear. Near the end of this cut, the point of the V pierces the lower wall of the tube and continues its shearing cut in both directions across the entire width of the bottom wall, severing the tube completely. Again, as the

shear is outward, any burr is at the outer wall.

Fig. 2 shows short lengths of cut tube, the chip produced (in a position inverted from that in which it is formed) and a third tube across the top of which three of the initial horizontal cuts only have been made. Chip width is  $\frac{1}{8}$  in. Use of this method has accomplished the desired results, as troubles caused by the interior burrs formerly produced have disappeared. • • •

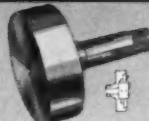
### Specify KASSON Precision Collets and Attachments



3AT,  
3C, 1A,  
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480 (AC-50) PUSH  
TYPE. All collets in  
hexagon, square and  
round for lathes,  
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tachments.



KLUTCH-KOLLET Step  
collet. Accurate chuck-  
ing to  $2\frac{3}{4}$ " dia. Soft  
head for easy boring.  
Lowest price on market!  
Models 3AT, 3C, 5C.

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DRAWBAR**  
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orders for  
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collets, live  
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ments!

**POSITIVE GRIP**  
Positive grip on un-  
dersize, oversize or  
standard diameter  
work. Patented co-  
ordinate cams elimi-  
nate fingers.

**LIVE CENTER  
(Ball Bear-  
ing). Double  
sealed for  
accuracy.**

**HAND  
DRAWBAR**  
 $\frac{1}{2}$ " cap.

**IMMEDIATE DELIVERY FROM STOCK**  
Guaranteed unconditionally. Distrib-  
utors inquiries invited.

**KASSON Precision**  
PRODUCTS

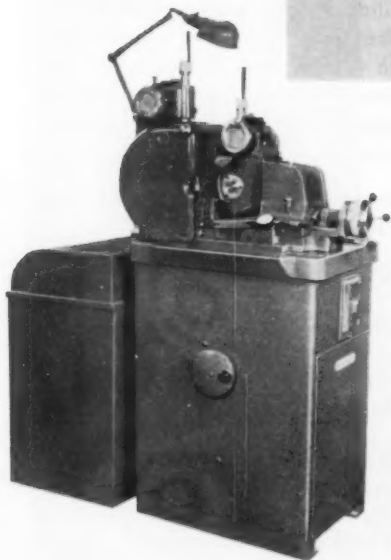
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**KASSON DIE AND MOTOR CORP.**  
32-14 Northern Blvd. • L. I. City 1, N. Y.

# Here's Your Answer —

**Low  
Cost!**

## **ROYAL MASTER CENTERLESS GRINDER**



Meets demand for Centerless Grinder with full capacity range from .004" to 1½" O.D., at a 50% lower price.

Tolerances of .0002" are readily held.  
6 - 8 microfinishes are easily obtained.

Now, with the Royal Master Centerless Grinder, you can do Precision Centerless Grinding in the entire .004" - 1½" range, from Tungsten Carbide to Plastics, with just one low-cost machine.

In addition to the range and quality of its work and its low cost, the Royal Master Centerless Grinder brings you bonus production features: low maintenance and operating costs, floor-space requirements of only 24" x 48", exceptional accessibility of work zone to both hands of operator, and a setup time down to ½ of the previous minimum..

*Get all the facts. Write today for our 6 page descriptive brochure, illustrating and describing in detail the Royal Master Centerless Grinder, and showing examples of its work. No obligation.*

### **ROYAL MASTER INC.**

**220 STATE HIGHWAY 23, RIVERDALE, N. J.**

# CAPTURE

## MIST • FOG • SMOG

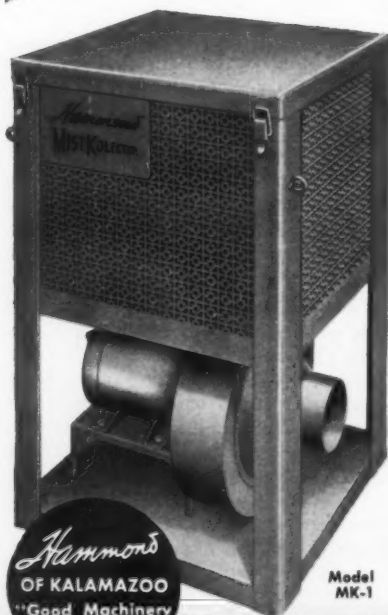
with a

# Hammond MISTKOLECTOR

Mist, Fog and Smog from automatic screw machines, lathes, surface and cylindrical grinders, and other machine tools can now be captured with a Hammond MistKolector. Requires little floor space, or can be suspended from ceiling. Two models available.

Hammond MistKolectors soon pay for themselves as they:

- Collect fog, mist and smog
- Recover coolant for re-use
- Give operators cleaner air to breathe
- Keep plant cleaner and reduce maintenance costs
- Reduce fire hazards



Model  
MK-1

*Hammond*  
OF KALAMAZOO  
"Good Machinery  
Since '82"

Write  
for Literature and Installation Photos

*Hammond Machinery Builders*

1614 DOUGLAS AVE. • KALAMAZOO, MICH.

Circle No. 316 on Card, Opposite Page 63

MACHINE and TOOL BLUE BOOK



*modern* **MACHINES** *demand*  
**MODERN** <sup>*solid carbide*</sup> **TOOLING!**

**Jarvis** **SOLID CARBIDE GIVES  
MAXIMUM EFFICIENCY AND ECONOMY!**

Forward-thinking management demands a tool in step with the times—a tool that delivers accuracy with **SPEED!**—and pays for itself by producing *more for longer periods*. That's why the big swing is to Jarvis carbide tools!

Jarvis tools are solid carbide—skillfully engineered to perform to ten-thousandths tolerances—and afford all the benefits of increased production and guaranteed economy inherent in carbide. Specify Jarvis . . . it's the profitable thing to do!

Jarvis designs and manufactures Special Tools for specific applications. Send details for prompt quotation. A Jarvis Representative is as near as your phone.



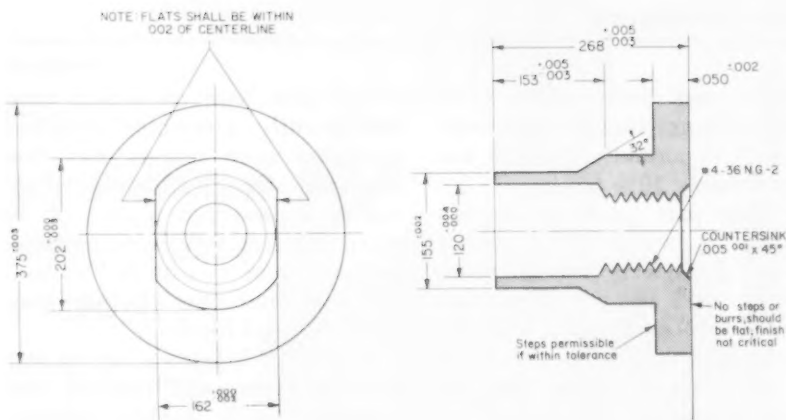
Send today for catalog  
describing hundreds of  
Jarvis production-  
increasing tools.

**Jarvis**  
CORPORATION  
POWER TOOLS FOR INDUSTRY  
MIDDLETOWN, CONNECTICUT

Circle No. 317 on Card, Opposite Page 63







3. TERMINAL RIVET—screw machine solved all problems.

## Machine Production?

The important factors to consider are not only the volume required but exacting tolerances, concentricity, surface finish and minimizing scrapped parts.

### SPECIAL TO MACHINE AND TOOL BLUE BOOK

● The choice of automatic screw machines for producing precision-made parts is often based solely on volume required.

However, where requirements call for exacting tolerances, concentricity and surface finish screw machine production is justified for a variety of finished parts.

For example, the worm screw,

shown in Figure 1, used to be cold headed, thread rolled, slotted and heat treated by the O. P. Held Co., New York. Certain disadvantages were encountered: cold heading was producing pieces with the 91° at 96°, and the closest tolerance that could be held was .010. In addition, the cold headed pieces also failed to hold the .140-.145 concentric with the thread.

Subsequently produced by automatic screw machine, concentricity and tolerances were held without

## Screw Machinery

continued

difficulty and with surface finish meeting the exacting specifications. And very importantly, the cost was approximately 10% lower.

Another part produced by the company is an assembly eyelet (Figure 2), which was likewise formerly cold headed. Disadvantages: the process failed to keep the squareness of the head to the shank, and tolerances could not be met satisfactorily.

Despite a higher original quotation, the eyelet was switched to screw machine production on the basis of other related factors. For example, the part in question

formed the base on which were subsequently assembled several fragile ceramic spacers and thin bimetallic strips. Each scrapped assembly represented a cost of 50 cents, whereas the screw machine produced part was quoted as one-half cent more than the part produced by cold heading.

Very little difference in cost was noted between cold heading and automatic screw machine production of a terminal rivet (Figure 3). Quality of the cold headed parts, however, was not acceptable. The part could better be produced on automatic screw machines. • • •

**Beverly THROATLESS SHEAR**  
*Cut any Shape...* **STRAIGHT OR IRREGULAR**



**B-3 with Ball Bearing Hold Down**

**INSIDE SLOTTER**  
8" Reach — 16 ga. cap.  
Makes inside slotting cutting faster, easier, cleaner. Punch and die arrangement of 5 blades assures accuracy, clean cutting action. Cuts  $2\frac{1}{2} \times \frac{1}{8}$ " slot at one stroke. Throat design permits pivoting work at any point in stroke for special inside cuts. Note sample cuts at left.



**INSIDE**

Make any cut — curved, straight or irregular, faster, easier and better with less material waste on a Beverly Throatless Shear. You can turn work to any position and make a clean cut as you go. Handles heavy gauges with ease—lighter metals without distortion. 4 models — capacities 16 gauge to 3/16" mild. All shears equipped with H.C. H.C. Blades for cutting Stainless.

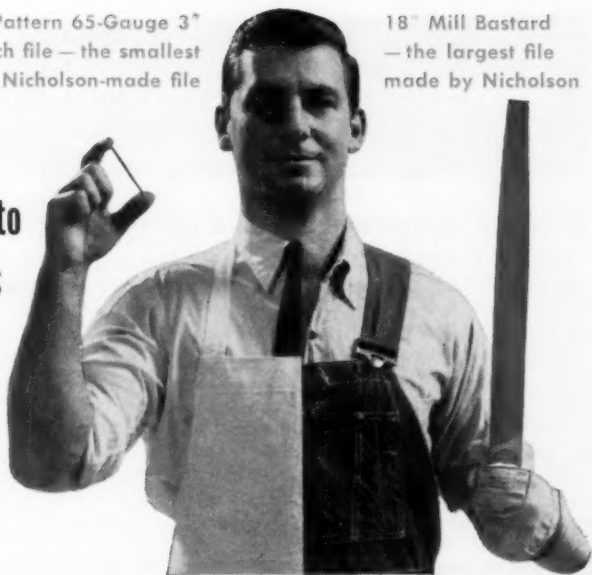
**BEVERLY SHEAR MFG. CO., 3005 W. 111th St., Chicago 43, Ill.**

Circle No. 318 on Card, Opposite Page 65

X.F. Swiss Pattern 65-Gauge 3"  
Broach file — the smallest  
Nicholson-made file

18" Mill Bastard  
— the largest file  
made by Nicholson

From  
micro-mechanics to  
forgings...there's  
a Nicholson or  
Black Diamond  
file for every  
purpose



You may not finish miniature dies or components by hand in your plant. And you may not dress huge forgings. But there's a Nicholson or Black Diamond file that's exactly right for each of these uses—and for every file use in between.

Depending on the job at hand, you can select X.F. (EXtra Fine) Swiss Pattern files in hundreds of shapes and sizes... Special Purpose files for aluminum, brass, lead, stainless steel, and other metals and plastics... Machinists' files, Regular Purpose files and rasps... from more than *six thousand* consistently high-quality Nicholson and

Black Diamond varieties for every need.

Your Nicholson or Black Diamond catalog will show you the wide choice of files and rasps available. And you can learn a lot about file selection, care and use from "File Philosophy," an interesting, profusely illustrated book that's yours for the asking.

If you happen to have an unusual filing problem, your industrial distributor is likely to have the solution. He's an expert with a specialized knowledge of industrial equipment and processes. So call on him for professional advice as well as service.

**Always specify Nicholson or Black Diamond brand**



**NICHOLSON FILE COMPANY, Providence, Rhode Island**

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**NICHOLSON FILE COMPANY**

**A FILE FOR EVERY PURPOSE**

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## B & S Expedites Order Filling

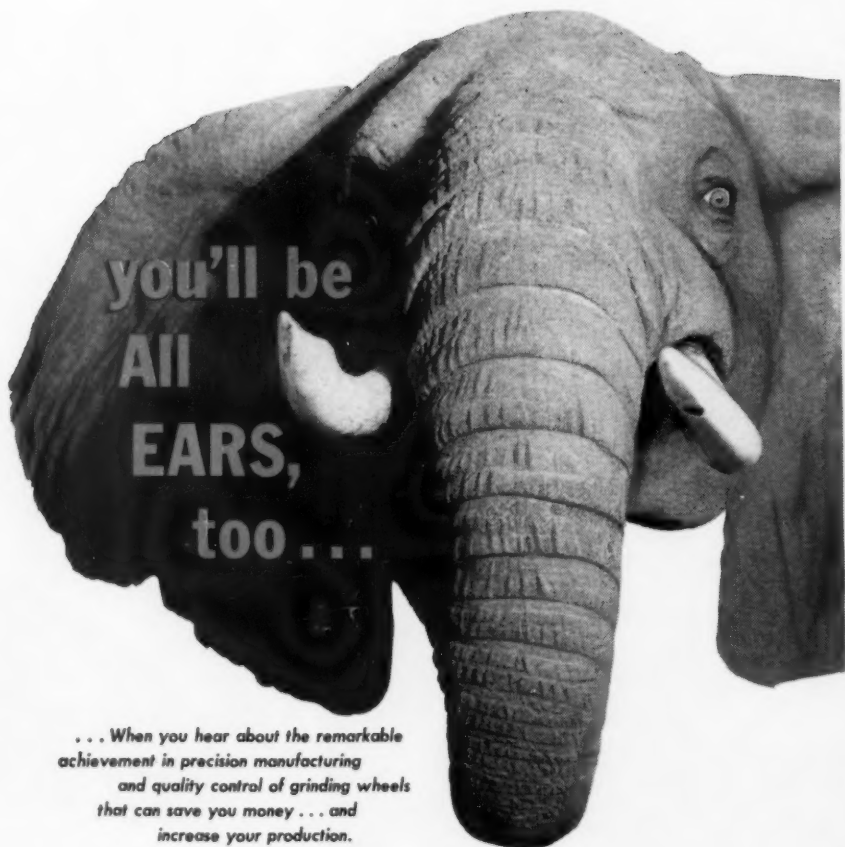
Brown & Sharpe Mfg. Co., Providence, R.I., has installed a new system of customer order filling. As the goods are picked from the shelves, they are immediately placed on a constantly moving belt which knits together the stock room and shipping areas. The belt is striped down the middle and a switch plate at the shipping room end automatically deflects the items which have been placed on one side of the stripe into the parcel post packing line

and those on the other side of the stripe into the consolidation station—and then on to the freight and express packers.

As the order passes the shipping clerk's stations, the goods are slid off the conveyor, wrapped, strapped or sealed, and then placed back on the belt to wind up at the postage meter and scales, or at the freight strapping machine and heavy duty scales as the case may be.



Screw machine tools are at the first "bend." Here, at the right, we see Harold Ingram, Joe Kochhan and Don MacIntosh who were largely responsible for this stocking and shipping facility.



... When you hear about the remarkable achievement in precision manufacturing and quality control of grinding wheels that can save you money ... and increase your production.

It's **POSITIVE DUPLICATION**—offered *only* by CINCINNATI (PD)<sup>®</sup> Grinding Wheels.

Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are *priced no higher than ordinary wheels.*

So, if you don't have an elephant's memory, make a pencil note to contact your CINCINNATI Grinding Wheels distributor. Or, contact us direct and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

And don't forget this—*only* CINCINNATI Grinding Wheels give you ...



POSITIVE DUPLICATION

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

\*Trade Mark Reg. U. S. Pat. Off.

**CINCINNATI<sup>®</sup>**  
Grinding Wheels

Circle No. 320 on Card, Opposite Page 65

# Acme-FETTE

Cuts threading costs to  
**\$0.000003**  
per piece

On an automotive part that required millions of *duplicate* pieces, one manufacturer found that the application of Acme-Fette thread rolling heads enabled him to:

1. Get required production with 9 Acme-Gridley bar automatics instead of 14






**2.** Secure better threading results with rolled threads which provided smoother, tougher threaded pieces.

**3.** Show a unit threading cost of *3 one-thousandths of a cent*.

**4.** Reduce total cost per piece more than 33  $\frac{1}{3}$  % while producing in excess of 35,000,000 pieces.

*Why not check Acme-Fette advantages on your threading jobs?*



New Acme-Fette Type N self-opening thread rolling heads are used with either rotating or non-rotating spindles. They let you complete threaded jobs on your present turning equipment without rehandling — roll threads 5 times faster than thread cutting methods (and with no chip problem).

# National Acme

THE NATIONAL ACME COMPANY, 177 EAST 131ST STREET, CLEVELAND 8, OHIO

SALES OFFICES: • Newark 2, New Jersey • Chicago 4, Illinois • Detroit 27, Michigan

## Celebration Draws Crowds to Ryerson Plant

Dedication ceremonies Sept. 20 at the enlarged Joseph T. Ryerson & Son, Inc. steel service plant, 203 Westside Ave., Jersey City, N.J., were attended by 3000 persons. At a preview Sept. 19, representatives of other steel firms and suppliers were guests of the company. The enlarged plant now has approximately 355,000 square feet of space devoted to warehousing, processing and shipping steel.

Hosts for the occasion were Ryerson officials headed by **Joseph L. Block**, chairman, **Charles L. Hardy**, president, and **William O. Springer**, manager of the New York plant. The ceremonies continued Saturday, Sept. 22, when approximately 1000 employees and members of their families were entertained as guests of the management.

Among the operations witnessed by the crowds were the cutting of steel with friction and flame and a demon-

stration of spark testing with the operator "reading" the sparks given off by a grinding wheel touched to steel to determine the analysis of the steel tested.

The new building, known as the South plant of the company's property, is sheathed in lustrous stainless steel. It has two spans, one 110 x 605 ft. and the other 85 x 580 ft. The added space is used mainly for warehousing structural, reinforcing and sheet steel, and the stocks of Reynolds aluminum which Ryerson is now selling.

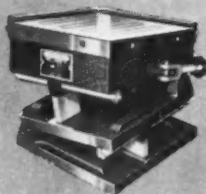
### Building other plants

Two other steel service plants are to be built for the company, one at Indianapolis, Ind., and the other at Charlotte, N.C.

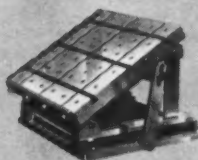
The two-span warehouses to be constructed on the sites will have adequate floor space for stocking a comprehen-

Officials greet visitors at 3-day open house. From left are James M. Mead, vice president, William O. Springer, plant manager, Charles L. Hardy, president, and at extreme right, Thomas Z. Hayward, vice president.

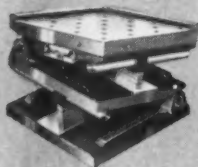




"Magna-Sine"  
Magnetic Sine  
Plates for precision  
set-ups grinding  
single or com-  
pound angles.



Heavy Duty Sine  
Plates for angular  
machining. Wide  
variety of sizes.  
12" square model  
shown.



Inspection Sine  
Plates for precision  
inspection and  
light machining on  
single or com-  
pound angles.

# ST

*Your First Choice*  
**FOR ANGULAR TOOLING . . . ROBBINS!**

A look at the record shows exactly why Robbins equipment for angular tooling should be your first choice! Here's the record:

**1ST** to originate the idea of a simple sine plate for faster angular toolroom set-ups—1936

**1ST** to build these as a standard product for general distribution—1936

**1ST** to build a non-magnetic sine plate designed specifically for precision inspection—1946

**1ST** with a permanent magnet chuck—1948

**1ST** heavy duty sine plate for angular machining—1954

**1ST** and the only one with the exclusive "PERMA-FLAT" SWIVEL BLOCK—1956

Robbins is the only sine plate manufacturer with a complete line of sine plates for every angular set-up problem in precision machining, grinding and inspection. We also offer complete engineering and manufacturing facilities for the solution of special problems, and are now building high-production automatic assembly and other special machines. Send for sine plate literature, or send us details of your requirements in special machinery.

*Simplify*

**ANGULAR  
GRINDING**

*Simplify*

**ANGULAR  
MACHINING**

*Simplify*

**ANGULAR  
INSPECTION**

**OMER E.**

24800 PLYMOUTH ROAD

*Robbins*

DEPT. A

**COMPANY**

DETROIT 39, MICH.

ALSO PRODUCERS OF SPECIAL MACHINERY, AUTOMATIC ASSEMBLY MACHINERY

Circle No. 322 on Card, Opposite Page 65

sive range of carbon, alloy and stainless steels. The buildings will be heated throughout, for the comfort of workmen and to preserve the finish of certain types of steel.

Two-story office buildings will each contain 8,000 sq. ft. of space. Offices will be air conditioned. The plants will be completed in late 1957.

## American Drill Bushing Co. Expands



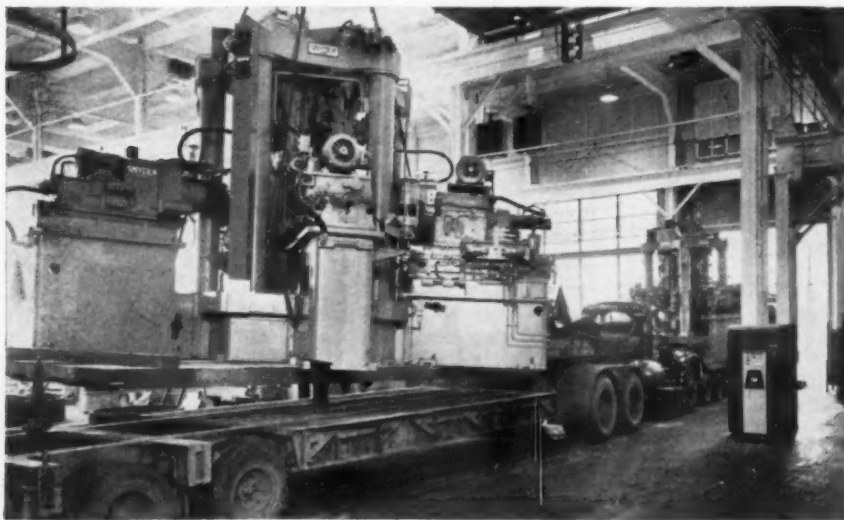
American Drill Bushing Co. has completed an addition to its factory at 5107 Pacific Blvd., Los Angeles.

The new building will enable the company to double its output of drill jig bushings.

## Snyder Tool Completes Expansion Program

Snyder Tool & Engineering Co. has completed a \$600,000 plant expansion in its Detroit plant, affording a 50 percent increase in floor space. Machine tools up to 250-ft. long and 25-ft. high can be assembled in the expanded facility.

A covered throughway enables trucks to drive into the plant, load the heavy machinery and drive out, thus protecting the precision automated machines from the elements during shipping operations.

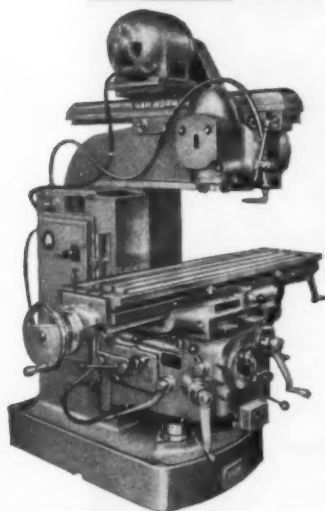


# Here's a Profitable Equation:

## 1 Van Norman Ram Type Miller = 2 Single Purpose Machines

### RESULT

**LESS** Capital Investment  
**MORE** Machine Productivity



The Adjustable Cutterhead eliminates the need of two single purpose machines . . . permits horizontal, vertical and angular milling without attachments.

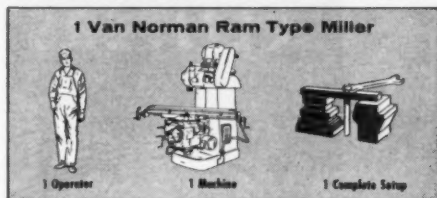
You can own a Van Norman Ram Type Milling Machine for as little as \$.81 per day per \$1000. investment.

Write for catalog and purchase plans giving complete details on all Van Norman Ram Type Millers.

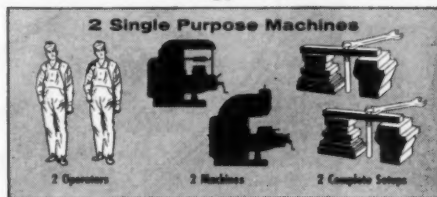
Don't wait . . . for extra profits install a Van Norman now! They are



WHICH WOULD YOU RATHER HAVE?



OR



available on many purchase plans—  
Outright sale . . . Purchase on conditional sales contract up to 5 years . . . Pay as you depreciate . . . See your dealer or write Van Norman Company.

Conditional Sales Contracts not available to Export.

**VAN NORMAN MACHINE CO., Springfield 7, Mass.**  
Manufacturers of: Ram and Column Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.

Circle No. 323 on Card, Opposite Page 65

## Almco Supersheen contest

Industrial firms using Almco barrel finishing equipment are eligible for cash awards in the new Supersheen contest ending December 31.

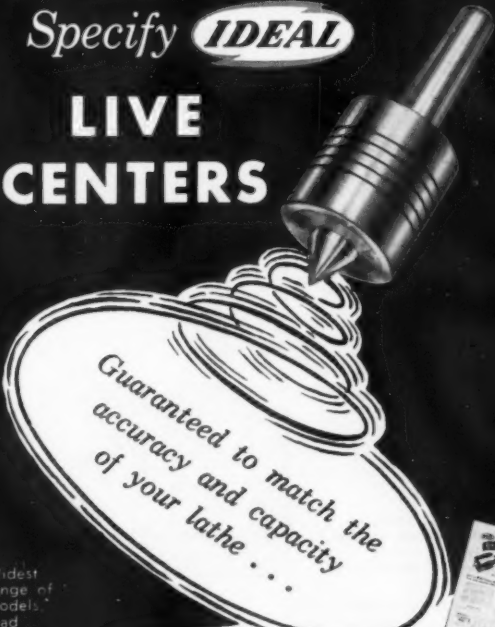
Firms entering the contest can obtain entry forms by writing Almco Wks., Inc., Div., Queen Stove, Albert Lea, Minn. Awards are made for the largest total dollar savings and also the great-

est percentage of savings as compared to previous finishing methods. Prizes of \$250, \$100 and \$50 will be awarded. A KampKold portable cooler is to be given for each entry in the contest in addition to the major awards.

Previous winners in Almco contests include the Underwood Corp. of Hartford, Conn.; Leroy Machine Co., Leroy, N.Y.; J. Bishop & Co., Malvern, Penn.; and Canadian Pratt & Whitney Aircraft Co., Quebec, Canada.

*Specify* **IDEAL**

**LIVE CENTERS**



Guaranteed to match the accuracy and capacity of your lathe...

Widest range of models, load capacities and tapers for every job!

ORDER FROM YOUR IDEAL DISTRIBUTOR OR MAIL COUPON...

**IDEAL** IDEAL INDUSTRIES, Inc.  
1441 Park Ave., Sycamore, Illinois

Kindly send us data on Ideal's complete line of LIVE CENTERS.

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

for { —greater confidence in gaging results  
 —continuous uniformity of production  
 —lower gage costs per piece inspected

get

**BESLY  
METRO**

**GAGES**

*Quality-Built to*

**STAY ACCURATE LONGER**

**Micro-Lapped  
Finish**

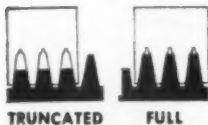
keeps gages accurate longer by reducing wear. No sharp "hills" and "valleys" to wear quickly and reduce gage accuracy.

**Extra Clearance**

at root of ring gages permits wear correction.



**Truncated Thread Form**



TRUNCATED

FULL

of thread plug at no extra cost. Enables accurate setting and permits easy check for gage wear.

**Convolution of First Full Thread**

on thread plug and ring gages removes sharp scoring edges and prevents chipping. Also makes Besly-Metro Gages easier to use.



**BESLY**

**BESLY-WELLES CORP.**

Established as Charles H. Besly & Co. in 1875

122 Dearborn Avenue • South Beloit, Illinois



TAPS



DRILLS



REAMERS



GAGES



**CARBIDE  
TIPPED  
TOOLS**



Circle No. 325 on Card, Opposite Page 65



## Detroit Broach changes name

Detroit Broach Co., Inc., has changed its name to Detroit Broach & Machine Co. President Gustav von Ries said that the new name is more indicative of the company's present activities because it has become a major factor in the design and manufacture of broaching machines since entering this field in 1952.

## Oneida buys Westcott assets

The Westcott Chuck Co., Oneida, N. Y., has sold all its assets to the newly formed Oneida Machine Tool Corp. According to Gordon Oakley, president of the new company, plans are being made to expand the chuck business along with the general machine tool business. All Westcott personnel have been retained.

# MISTKOP

STOPS  
MIST



COLLECTS MIST-FOG EFFECTIVELY  
IN A SMALLER SPACE



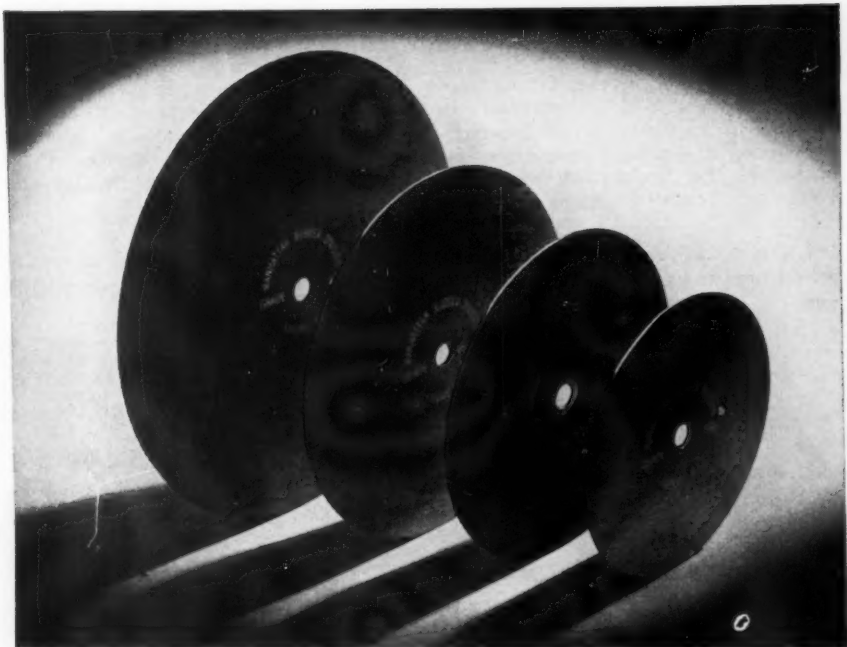
NON-  
ELECTRONIC!

This efficient Mistkop unit provides low-cost mist control for all machining operations employing coolants or lubricants. Requires no duct work or costly piping—is actually portable!

Mistkop is sturdy in design—has a minimum number of parts and gives long, trouble-free service. Stops clouding of lights... eliminates fire hazards of uncontrolled mist. Write for detailed description.

**AGET** Manufacturing Company  
1386 Church Street • Adrian, Michigan

Circle No. 326 on Card, Opposite Page 63



## Cleaner Cutting...Longer Wheel Life with MANHATTAN CUT-OFF WHEELS

Every Manhattan Cut-Off Wheel is custom-bonded to cut cleaner at higher speeds on specific cut-off jobs . . . with hardened steel, soft steel, light gauge tubing or critical alloys. Factory records of the number of cuts per wheel

have proved they do a better job . . . and *last longer* than any other wheels!



Manhattan Cut-Off Wheels are custom-manufactured for your specific requirements in the widest range of types and sizes. Let a Manhattan Abrasive Wheel engineer show you how you can save time and money . . . get "More Use per Dollar" . . . with Manhattan Cut-Off Wheels and other types of high speed, heavy duty wheels.

RM-530R

WRITE TO ABRASIVE WHEEL DEPARTMENT

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY



**RAYBESTOS-MANHATTAN, INC.**

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose Fan Belts • Brake Linings & Blocks • Clutch Facings • Packings • Asbestos Textiles Engineered Plastic, and Sintered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

Circle No. 327 on Card, Opposite Page 65

## Ross Builds Millionth Valve

Ross Operating Valve Co., Detroit, celebrated two big events during September—35 years of growth and the building of its one millionth job-engineered valve. Unlike a production line operation, the firm's 2000 models of valves are designed for the particular

air control needs of specific machines.

In 1921, Charles A. Ross formed the company to produce a hand-operated valve he invented. The one millionth valve was produced on September 12, and was fold plated for displaying.

Left to right, Carl Halpin, manager of engineering; Herb Gailey, assistant chief engineer for research and development; Grant Wilcox, plant manager; R. J. Cameron, president, look over the firm's millionth valve.



## Jones & Lamson buys Modern Tool

Jones & Lamson Machine Co., Springfield, Vt., has acquired the physical inventory, work in process, trade names, design and customer good will of the Modern Tool Works, Rochester, New York. The new owner plans to integrate the Modern Tool line with its existing products in the thread tool division. The new line will consist of collapsible taps and chasers, solid adjustable taps and chasers, the Modern Magic chuck, and the Modern stud setter.

## J. W. C. Bullard

Joseph W. C. Bullard, 74, retired vice-president and member of the board of directors of the Bullard Co. died of a heart attack September 16 on board his sloop the "Vega."



Mr. Bullard was the last of the five sons of Edward Payson Bullard, Sr., founder of the company. All devoted their lives to the development of the firm.

**Go & Go**



## **A VERSATILE MILLING CUTTER?**

Sure, that's the best description you could apply to a Go & Go inserted high-speed steel blade milling cutter. Here's a tool that's equally at home banging out high production day after day or down in the toolroom carefully carving out a new die. And you can use it on almost any material.

When blades wear, and they do, it's a simple matter to set them out, resharpen and put the cutter back in production. After you've squeezed the last bit of tool life out of the blades, just order new ones from stock and insert them in the cutter body. Blade cost is so low most shops keep several sets on hand all the time.

You can choose just about any style and size of inserted HSS blade milling cutter you'll ever need from the complete line of standards manufactured and stocked by Go & Go. For specifications, ask for Catalog "F". Go & Go also designs and manufactures special milling cutters in quantity. Check your nearest Go & Go representative for details.

**GODDARD & GODDARD COMPANY**

DETROIT 23, MICHIGAN

Engineering and producing tools that Go & Go since 1917.

## Greenfield buys Horton

Greenfield Tap and Die Corp. has purchased all of the assets of the Horton Chuck Division of E. Horton & Son Co. of Windsor Locks, Conn. The firm, which has been in business since 1851, is the oldest chuck company in the world. For the present, manufacturing operations will continue in Windsor Locks.

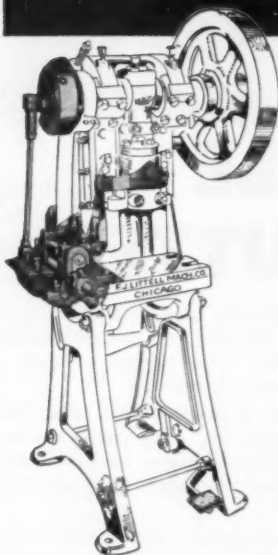
## Cincinnati Shaper expands

The Cincinnati Shaper Co. has announced plans for the construction of additional manufacturing, administration and engineering facilities at its Whitewater shop. Construction of the building is scheduled for completion early in 1958. It will add approximately 180,000 square feet to the Whitewater shop.

Automation in Action . . .

### LITTELL Style "M" ROLL FEED

Makes Any Punch Press Fully Automatic—  
and 3 Ways Better



• **FASTER** . . . 9,000 stampings an hour at 200 strokes per minute, or 4500 stampings an hour at 100 strokes per minute are easy production rates on any press with Style "M" Roll Feed.

• **SAFER** . . . Automatic feeding with Style "M" Roll Feed keeps hands and fingers safe from costly accidents.

• **LOWER IN COST** . . . Faster, automatic production from low cost coil stock cuts cost per stamping. Greater safety gives your presses the lowest insurance rate.

The Style "M" Roll Feed is quickly and easily installed on any standard punch press. Several models are available—the largest feeds coil stock up to 8" wide and .055" thick. All models feed left to right, right to left or front to back. Feed direction is reversed by reversing the clutch. On large models, feed length per stroke is from 0 to 4 1/4" with standard gears, and from 0 to 8 1/2" with compound gears. Feeding rolls are hardened and ground for long service life. Style "M" puts automation in your press room at lowest possible cost.

Write for the Littell Roll Feed Catalog



ROLL FEEDS • DIAL FEEDS  
STRAIGHTENING MACHINES  
REELS • AIR BLAST VALVES  
District Offices: Detroit, Cleveland

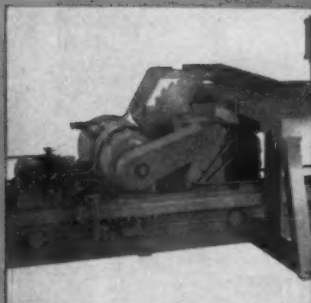
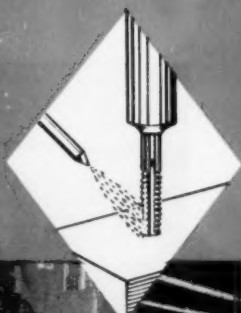
4147 N. RAVENSWOOD AVE., CHICAGO 13, ILL.

Circle No. 329 on Card, Opposite Page 65

# Norgren **SPRAY-LUBE**

## INCREASES PRODUCTION from MACHINE TOOLS

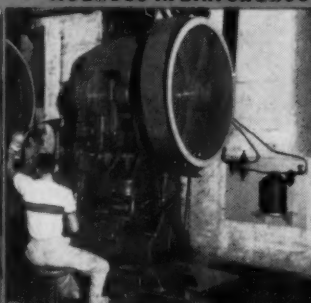
- Increases Tool Life
- Improves Quality of Work
- Reduces Maintenance Costs



**Metal Cutting Saw**

**CUTS FASTER...  
DONES'T OVERHEAT**

By changing to SPRAY-LUBE:  
(1) Fusion of chips to saw teeth  
ended. (2) Surfaces now resemble  
machined finish. (3) Saw feed  
faster.



**Punch Press**

**OUTPUT INCREASED 15%  
DIE LIFE INCREASED 100%**  
SPRAY-LUBE automatically lubri-  
cates die and blank every cycle,  
increasing die life 100% and  
output 15%. Lubricant cost cut  
in half.



**Tapping Machine**

**30% MORE OUTPUT**  
At the Square D Company,  
SPRAY-LUBE eliminated excessive  
lubrication and ended time lost  
for cleaning parts. Production  
increased 30%.



**Gear Hobbers**

**\$250 A YEAR LUBRICANT  
SAVING PER MACHINE**

SPRAY-LUBE on gear hobbers at  
Cullman Wheel Company: (1) In-  
creased tool life. (2) Reduced tool  
grinding time. (3) Saved \$250 a  
year lubricant costs per machine.



**Turret Lathe**

**OUTPUT DOUBLED**  
SPRAY-LUBE on lathe at O. K.  
Rubber, Inc. has: (1) Doubled  
output of machine. (2) Ended  
welding of chips to tool. (3) Im-  
proved quality of work.



**Chain Drive**

**OVER TWO TIMES  
LONGER CHAIN LIFE**  
At Wagner Electric Corp.,  
SPRAY-LUBE on a degreasing  
machine has eliminated noise  
and doubled chain life.

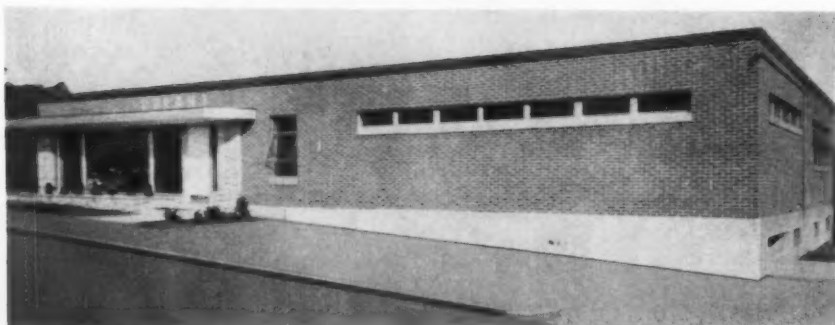
For complete information about Norgren SPRAY-LUBE, call your nearby  
Norgren Representative listed in your telephone directory — or WRITE  
THE FACTORY FOR BULLETIN 537.

**C. A. NORGREN CO.**

3430 So. Elati St., Englewood, Colo.







**NEW GENERAL OFFICE AND WAREHOUSE** of the Durant Tool Supply Co., located at 1 Thurburs Ave., Providence, R.I. The building provides increased stocking and shipping facilities as well as a large operating display area.

## Appointments and Promotions

### Changes in Executive and Production Personnel

Name	Company	To	Position
Edward J. Shages	Pratt & Whitney Co., Inc. West Hartford 1, Conn.	Same	Vice Pres., Mgr., Cutting Tool, Gage Divisions
R. R. Allen	John Wood Co. Muskegon, Mich.	Same	Vice Pres., Dir., Engineering and Research
G. W. Brooks	U. S. Navy, Ret.	Sargent Engineering Corp. Huntington Park, Calif.	Exec. Asst. to Gen. Mgr.
Walter A. Cox	Vascoloy-Ramet Corp. Waukegan, Ill.	WW Alloys, Inc., Div. of Fansteel Metallurgical Corp. Detroit, Mich.	General Manager
Alexander H. d'Arcambal	Pratt & Whitney Co., Inc. West Hartford, Conn.	Has retired from his position as Pres., Gen. Mgr. and as Chairman of the Board of Potter & Johnston Co., a P. & W. Subsidiary.	
Edward P. Gillane	Pratt & Whitney Co., Inc. West Hartford, Conn. Potter & Johnston Co. Pawtucket, R.I.	Same Same	President Chairman of the Board



**Edward J. Shages**



**G. W. Brooks**



**A. H. d'Arcambal**



**E. P. Gillane**

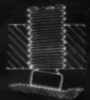




## VLIET SWIVEL-PAD CLAMPS

*Now Available in 2 Types!*

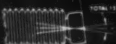
**Both types have these outstanding features!**



- Screw torque absorbed by pad — not the work piece.



- Unique ball-joint construction provides extremely smooth angle adjustment and rotation of pad.



- Pad swivels 7½° each side of center line in all directions.



- Large flat pad area assures tighter clamping.



- Conical seat distributes clamping pressure uniformly.
- Eliminates costly, custom-made swivel pads.
- Du-Lite finish for rust proofing.
- Made from heat-treated, alloy steel to last for years.



### The new Knurled Head Swivel-Pad Clamp

Use when finger-type clamping is sufficient. Wide knurled-head gives good gripping; assures fast screw run-in. Available in 4 different screw diameters; 1½" and 2" screw lengths.



— Pat. Pend.

### The Socket Set Swivel-Pad Clamp

Use wherever maximum rigidity is necessary, or where space is limited. Available in 7 screw diameters; various lengths.

#### Other Vliet products



Spring Plungers



Spring Stops



Toggle Pads



Fixture Keys



Torque Thumb Screws



**VLIET ENGINEERING**  
INCORPORATED

8900 Santa Monica Blvd., Los Angeles 46, California



Write for  
free 1956  
Vliet catalog.

Distributors located in major U.S. and Canadian industrial areas.

Circle No. 331 on Card, Opposite Page 65

## Changes in Executive and Production Personnel

Name	Company	To	Position
Earl R. Lewis, Jr.	Pratt & Whitney Co. West Hartford, Conn.	Same	Production Mgr., Cutting Tool & Gage Divisions
John Jeppson	Norton Company Worcester, Mass.	Same	Vice Pres.-Gen. Mgr., Abrasive Div.
William G. Fallon	Norton Company Worcester, Mass.	Same	General Mgr., Refractories Div.
Howard J. Dalv	Norton Company Worcester, Mass.	Same	Vice Pres.-Gen. Mgr., Electro-Chemical Div.
Duane E. Webster	Norton Company Worcester, Mass.	Same	Asst. to Director of Mfg.
Frank G. Gifford	Norton Company Worcester, Mass.	Same	Works Mgr., Abrasive Div.
David Reid, Jr.	Norton Company Worcester, Mass.	Same	Factory Manager
Harold E. White	Norton Company Worcester, Mass.	Same	Asst. Mgr., Crushing Plants

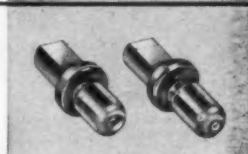
Call on **CLARK**

for All Your "Rockwell Testing" Needs

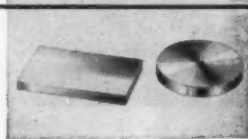
CLARK Diamond Cone Penetrators are exactly right for your "Rockwell" hardness tester, whether or not it bears the CLARK name. Every step in their manufacture, from careful diamond selection to expert lapping, leads to a precision product that will give you precision results. Yet CLARK Diamond Penetrators cost surprisingly little.



CLARK Steel Ball Penetrators, for accurate "Rockwell testing" of unhardened steel, cast iron, brass, bronze, and similar materials, are available in all standard sizes.



CLARK Test Blocks, in various hardness grades, provide a quick, sure, and simple method of checking the accuracy of your "Rockwell" type hardness tester.



Write today for descriptions  
and prices.

**CLARK INSTRUMENT, INC.**  
10206 Ford Road • Dearborn, Mich., U.S.A.

**CLARK**  
DIAMOND CONE PENETRATOR  
**CLARK**

Circle No. 332 on Card, Opposite Page 65

# CUSHMAN chucks

## give Chuck-ability

**CHUCK-ABILITY** — The ability to **SPEED** your work . . . **ELIMINATE** fatigue . . . **IMPROVE** your products . . . and **REDUCE** your costs . . . through design and selection of the right work-holding devices.

**the key to machining efficiency**



The Cushman Power Wrench, push-button controlled, eliminates time-consuming, fatiguing, hand wrenching of chucks on single and multi-spindle machines, especially where repetitive machining operations are being performed.

Cushman Power Wrenches are available with either an 8 or 24 ft. lb. motor, delivering a maximum of 180 or 600 ft. lbs. torque respectively. With the addition of the Cushman Variable Torque Control, developed especially for use with the Power Wrench, the operator may, by setting the selector switch, choose any one of 9 approximately equal stages of torque and inertia. Wrenches equipped with 8 ft. lb. or 24 ft. lb. stall-type motors will deliver from 45 to 180 ft. lbs. or 150 to 600 ft. lbs. respectively.

If greater or less driving force is required, the Cushman Engineering Department can design wrenches to suit your needs. Write Cushman for Bulletin No. 211D fully describing and illustrating the Cushman Power Wrench — or, should you have a special work-holding problem, consult Cushman.

### THE CUSHMAN CHUCK COMPANY

Hartford 2, Connecticut

### CUSHMAN CHUCKS . . .

a Product of American Quality,  
Labor and Materials.

a world standard for precision



Circle No. 2A on Card, Opposite Page 65

**SEE YOUR INDUSTRIAL DISTRIBUTOR**

manufacturers of:

Air Operated Chucks, Cylinders, and Accessory Equipment . . . The Cushman Power Wrench . . . Cushman Manually Operated Chucks and Face Plate Jaws.



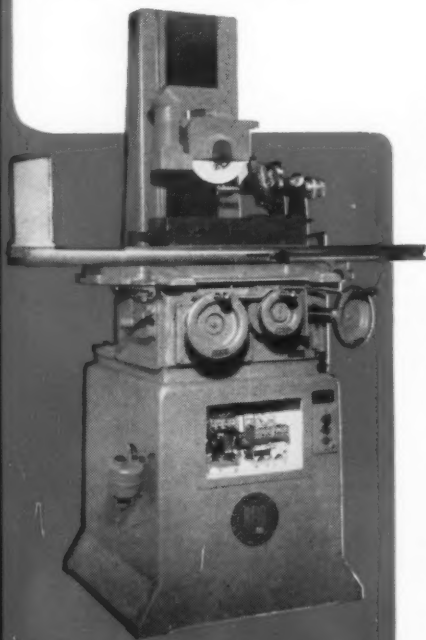
# SETS THE STANDARD

*for Precision*

# SURFACE GRINDERS



**MODEL 824** Reid-O-Matic with push-button controls for fast selection of all grinding operations and quicker set-up and changes. Outstanding features, for production and toolroom grinding, include: finger-tip level controls, electrical components in single, sealed base housing for easy access, and adjustable gibs on head ways.



#### Specifications:

Capacity — 8" wide, 24" long, 15" high  
Worktable — 66" by 10 $\frac{1}{4}$ " overall  
Table speed — infinite variation, 0 to 75 fpm.  
Feed range — elevating mechanism, to .0005";  
vernier, to .0001"  
Spindle — 2 H.P., 1800 rpm. (std. cartridge type)

**MODEL 618** — the standard for truly precise toolroom grinding. Features include: rugged construction with one-piece column, cogged timing belt for smooth table operation and sealed cartridge type motorized spindle for smooth chatter-free operation.

#### Specifications:

Capacity — 6" wide, 18" long, 17 $\frac{1}{4}$ " high  
Worktable — 51" by 8" overall  
Table speed — infinite variation, 12 to 35 fpm.  
Feed range — elevating hand wheel-to .0005";  
cross feed — to .001"  
Spindle — 1 H.P., 3450 rpm.

*For full details and specifications write for  
Bulletin 800-16*

Circle No. 28 on Card, Opposite Page 65

**Reid Brothers**



**Company, Inc.**

BEVERLY

MASSACHUSETTS

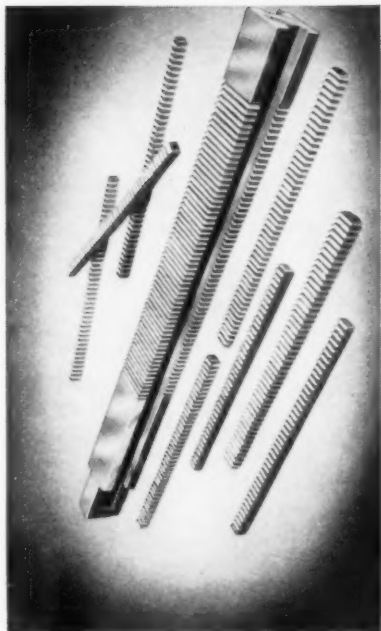
## Ask your Diemaker ! \*

*\* We jumped from  
16,000 to over 60,000  
pieces per grind with*

**Darwin**

**PRK • 33  
TOOL STEEL**

This profit-making story from a Philadelphia Tool & Die Shop is what you can expect when you specify Darwin PRK-33 Tool Steel. Here's why! By adding Cobalt to Darwin PRK-33, a secondary hardness is achieved which makes the improved and hardened steel ideal for tools and dies which must undergo long runs at high temperatures. In addition, PRK-33 Cobaltcrom is one of the few steels which *grind super-keen* as well as being unsurpassed for dies which require a perfect edge for eliminating flash. No wonder the expert diemakers look to PRK-33 when they want to increase die life and reduce re-grinds! So why not call or write for information on the complete line of Darwin Tool Steels today! You'll be money ahead!



**Broach dies of PRK-33  
Cobaltcrom Steel**

Complete line of highest grade Tool Steels, including PRK-33, DARWIN No. 1, NEOR, MINEOR, OHT, "MT6" and various grades of Hot Work Specialty Steels. **Furnished in Bar Stock, Billet and Sand Casting, Drill Rod, Flat Ground Stock and Tool Bits.**

Bulletin on Request

**DARWIN & MILNER Inc.**

*highest grade tool steels*

**2345 ST. CLAIR AVENUE ★ CLEVELAND 14, OHIO**  
★ 1410 W. FIRST AVENUE ★ COLUMBUS, OHIO ★

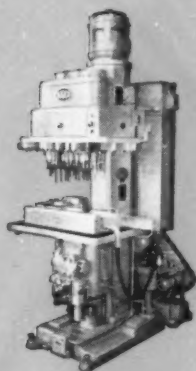
REPRESENTED BY

ZIV STEEL & WIRE CO., CHICAGO • DETROIT • ST. LOUIS • INDIANAPOLIS • TOLEDO • MILWAUKEE  
• M. G. OPP COMPANY, NEW YORK CITY • PECK STEEL & DIE SUPPLY COMPANY, LOS ANGELES •  
CHARLES B. WEBSTER, PLAINVILLE, CONNECTICUT • CHARLES W. BRINGMAN, ORLANDO, FLORIDA

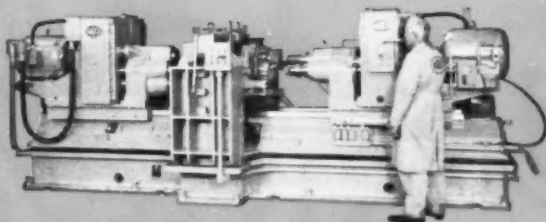
# Drill ■ Bore ■ Face ■ Tap

## ON A MULTI-SPINDLE NATCO®

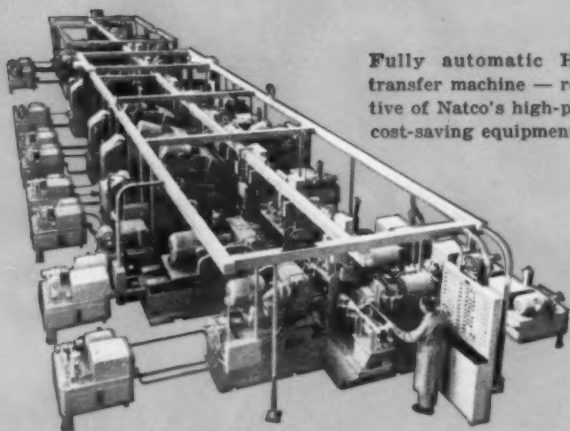
**High production or job lot flexibility...** Natcos range from small, light sensitive drilling and tapping machines to fully automatic, high-production transfer machines. Special machines designed and fixtured to solve specific production needs.



High-speed, light sensitive, multi-spindle drillers and tappers. Available with adjustable heads, hand and foot feed or hydraulic feed tables. 3-position automatic fixture slides and rotating tables for fixtures.



Way-type horizontal machines for drilling, boring, facing and tapping. Hydraulic feed, automatic lubrication to heads, individual lead screws for tapping, coolant systems with magnetic chip separators.



Fully automatic Holeway® transfer machine — representative of Natco's high-production, cost-saving equipment.

Call Natco offices in Chicago, Detroit, Buffalo, New York, Boston, Philadelphia, Cleveland and Los Angeles. Distributors in other cities.

**NATIONAL AUTOMATIC TOOL COMPANY, INC.**  
Richmond, Indiana

Circle No. 2D on Card, Opposite Page 65





E. R. Lewis, Jr.



John Jeppson



W. G. Fallon, Jr.



H. J. Daly

# TOWNSEND

OF HARTFORD

## QUALI-MATIC MACHINES

**LOW COST  
AUTOMATION for  
every production  
application.**

**4 lines  
in 1**

Call on H. P. Townsend's specialists in mechanization. By drawing on Townsend of Hartford's extensive library of "*Mass Production Case Histories*" these specialists can show you proven applications for savings in operations, machining time, materials handling and direct labor.

**1 The H. P. TOWNSEND  
MANUFACTURING CO.**

- High-Speed Shavers
- Riveters • Automatic Screw Machines • Special Machines

**2 COCHRANE-BLY.**

- Metal Sawing Machines

**3 CLEVELAND TAPPING  
MACHINE CO.**

- Drilling and Tapping Machines • Fitting Machines • Indexing Tables

**4 TAYLOR and FENN  
(Machine Division)**

- Duplex Spline Millers
- Spring Presses
- Drilling Machines

**The H. P. TOWNSEND MANUFACTURING CO.**  
HARTFORD 10, CONNECTICUT

Circle No. 334 on Card, Opposite Page 65



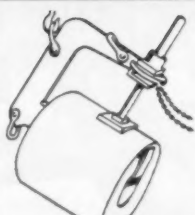
## Changes in Sales and Service Personnel

Name	Company	To	Position
James J. Smith, Jr.	Wesson Co. Ferndale, Mich.	East Paterson, N.J.	District Manager
Joseph Maurer	Wesson Co. Ferndale, Mich.	East Paterson, N.J.	Sales Engineer
Charles Ensign	Wesson Co. Ferndale, Mich.	East Paterson, N.J.	Sales Engineer
Frank Mercer	Federal Carbide and Cutter Co. Rochelle Pk., N.J.	Wesson Co. East Paterson, N.J.	Sales Engineer
Mrs. Frances Walser	Wesson Co.	East Paterson, N.J.	Office Manager
C. H. Priefer	Philadelphia, Pa. Metch & Merryweather Machinery Co. Cleveland, O.	Same	District Sales Manager

## ***Dixon*** **ONEMAN** COIL GRABS COST LESS...increase efficiency & safety



Coil Grab—up to 5,000 lbs.  
cap., 1" to 24" widths



Coil Handler—up to 35,000  
lbs. cap., 18" to 48" widths



Coil Hook—up to 1,000 lbs.  
cap., 1/4" to 6" widths

### COIL GRAB

Model No.	Max. Coil Wgt. - Cap.	Width Stock Handled		Radial Cap. Stock Hld.	
		Min.	Max.	Min.	Max.
A-10	1,000 lbs.	1"	4"	3 1/2"	13"
A-20	2,000 lbs.	2 1/2"	9"	3 1/2"	12"
A-35	3,500 lbs.	7"	16"	4"	12"
A-50-12	5,000 lbs.	4"	12"	7"	24"
A-50-24	5,000 lbs.	10"	24"	4"	10"

### COIL HANDLER


M-30	15,000 lbs.	18"	30"	8"	16"
M-36	15,000 lbs.	24"	36"	8"	16"
M-48	15,000 lbs.	24"	48"	8"	16"

### COIL HOOK

H-10-6	1,000 lbs.	1/4"	6"	1"	13"
--------	------------	------	----	----	-----



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**W&B**

## **CARBIDE DRILLS and REAMERS**

- ★ LONGER LIFE
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*"Makers of Fine Tools Since 1848"*

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DRILLS, REAMERS, COUNTERBORES, COUNTER SINKS, TOOL BITS, CARBIDE TOOLS, SPECIAL TOOLS

**40045 PLYMOUTH ROAD**

NEW YORK

**PLYMOUTH, MICHIGAN**

CHICAGO

LOS ANGELES

## Changes in Sales and Service Personnel

Name	Company	To	Position
David S. Baus	Notch & Merryweather Machinery Co. Cleveland, O.	Same	District Manager
Leo J. Rickes, Jr.	Monsanto Chemical Co. Springfield, Mass.	Adamas Carbide Corp. Kenilworth, N.J.	Advertising & Sales Promotion Mgr.
A. G. Warren	Baker Brothers, Inc. Toledo, Ohio	Same	Regional Sales Mgr., Syracuse, N.Y.
J. P. Nugent	Baker Brothers, Inc. Toledo, Ohio	Same	Regional Sales Mgr., Dearborn, Mich.
Robert A. Cole	Bryant Machinery and Engineering Co. Chicago, Ill.	Cincinnati Gilbert Machine Tool Co. Cincinnati, O.	Sales Manager

# quadrill

4 Position Drilling and  
Tapping  
**TURRET HEAD**

Does the work of  
4 drill presses

**DRILLS • REAMS  
COUNTERSINKS  
COUNTERBORES**

The quadrill performs all these operations without setting up each time. Any of four cutting tools can be brought into drilling position by indexing the turret. A real time and cost saver!



**FITS ALMOST  
ANY DRILL PRESS**

## TAP with the **quadtapper**



**FOR USE ON QUADRILL ONLY**



By attaching the QUAD-TAPPER to any of the four spindle assemblies of the QUADRILL, you can drill and tap almost simultaneously. Affords accurate tapping at high speeds.

**DESIGNED FOR PRODUCTION  
COST CUTTING**

Send for complete details of both QUADRILL and QUAD-TAPPER construction and operation features.

**CHICAGO QUADRILL**

*Company*

1846 BUSSE HIGHWAY • DES PLAINES, ILL.



Leo J. Rickes, Jr.



A. G. Warren



J. P. Nugent



Robert A. Cole

# QUIET

*as a gentle breeze!*



MODEL  
7500-B

## *New* **ARO** **DULCETONE** **SCREWDRIVER**

Reduce noise to a whisper in your assembly operations . . . cut down operator fatigue . . . use ARO Dulcetone Air Screwdrivers! This slim compact tool runs with a *quiet gentle* exhaust. Light weight . . . 1800 r.p.m. Capacity No. 8 nuts and machine screws. Now offered as standard tools . . . immediate delivery. Ask your ARO Distributor.

### THE ARO EQUIPMENT CORPORATION

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Aro of California, 3141 S. Grand Ave., Los Angeles 7  
Aro Equipment of Canada, Ltd., Toronto 15, Ontario  
Offices in All Principal Cities

## ARO

### AIR TOOLS

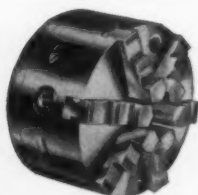
Also... Air Hoists... Lubricating  
Equipment... Aircraft Products  
... Grease Fittings

Circle No. 340 on Card, Opposite Page 65

## Changes in Sales and Service Personnel

Name	Company	To	Position
Frank Curtis	Morse Twist Drill & Machine Co. New Bedford, Mass.	Same	Carbide Tool Co-ordinator
Lewis Campbell	Morse Twist Drill & Machine Co. New Bedford, Mass.	Same	Detroit District Manager
Frank C. Johnson	Morse Twist Drill & Machine Co. New Bedford, Mass.	Same	Ohio District Manager
J. Robert Jones	Kearney & Trecker Corp. Milwaukee, Wis.	Same	Vice President, Sales
H. W. Kippers	Kearney & Trecker Corp. Milwaukee, Wis.	Same	Sales Mgr., Standard Machinery Div.

**compare  
HORTON  
Tru-Set  
FEATURES**



- Repetitive accuracy to .0002" T.I.R. guaranteed
- Rugged Meehanite bodies guaranteed for life
- Instant peripheral location - 3 operating pinions
- Available up to 12" in both 3 and 6 jaw styles
- Packed in reuseable airtight metal containers

**compare  
HORTON  
Tru-Set  
PRICES**

SIZE	MODEL	NET PRICE
5	5T6	86.35
6	6T6	120.65
8	8T6	167.65
10	10T6	247.65
12	12T6	298.45

Chucks listed above are 3 jaw universal type with two sets of jaws. See your Horton Distributor or write direct for new Net Price Selector



**HORTON CHUCK DIVISION**  
GREENFIELD TAP AND DIE CORPORATION  
WINDSOR LOCKS, CONN.



**"Red Tang"  
AMERICAN PATTERN  
FILES and RASPS**

For general or special purpose machine tool  
filing, saw sharpening, and for use on  
wood, leather and soft metals.

**NOW...**

# **SIMONDS**

**has a Complete Line  
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Simonds now offers you all types of files in the Right Length, the Right Shape and the Right Cut for every filing job. What's more, Simonds Files are Grade A. First Quality only . . . backed by Simonds reputation for outstanding quality, dependability and service.

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Huller Tool Co., Newcomerstown, Ohio  
Simonds Abrasive Co., Phila., Pa., and Arvada, Que., Canada

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**SWISS PATTERN  
FILES**

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craftsman is a matter of skill  
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For general purpose filing in hand and machine  
shops, machine shops, and  
automotive plants, machine  
shops, foundries.

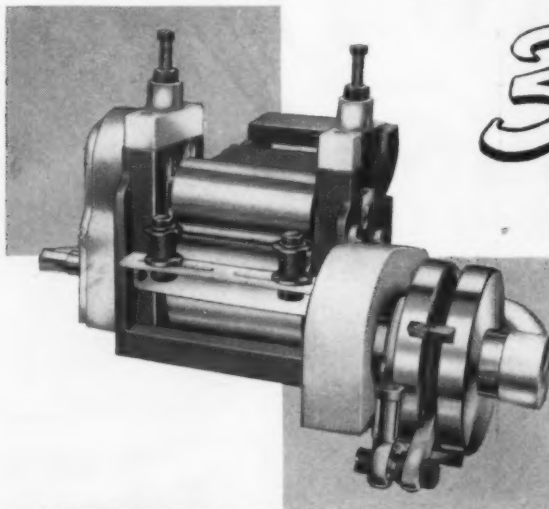
**VIXEN  
Milled Curved-Tooth  
FILES**

For work, machine shops on both  
hand and machine, machine  
shops, and for use on  
steel, cast iron and steel  
in general.



## Changes in Sales and Service Personnel

Name	Company	To	Position
C. A. Pfendbach	Lavalee & Ide, Inc. Chicopee, Mass.	Same	Vice President, Sales
R. F. Myers	Lees-Bradner Co. Cleveland, O.	Metc & Merryweather Machinery Co. Cleveland, O.	Sales Manager
Carl F. Enroth	Kearney & Trecker Corp. Milwaukee, Wis.	Same	Sales Mgr., Special Machinery Div.
Douglas C. Cunningham	General Motors Corp. Indianapolis, Ind.	Standard Gage Co., Inc. Poughkeepsie, N.Y.	Sales Manager
Ulric R. Jaeger	Superior Bearing Bronze Co. Brooklyn, N.Y.	Olin Mathieson Chemical Corp. New York, N.Y.	Sales Engineer, Roll Bond Dept.



**3 REASONS  
"RFC"  
AUTOMATIC FEEDS  
ARE YOUR  
BEST BUY**

**REVERSES  
INSTANTLY**

*A flick of the  
finger.*

**FEEDS IN  
THOUSANDTHS**

*Amazingly accurate.*

**MAINTAINS  
ORIGINAL SETTING**

*No ratchets to  
wear down!*

**MODELS TO FIT ALL PRESSES**

**WRITE FOR CATALOG SHEET**



**Roll Feeds Corp.**  
**ASHTON, R. I.**





C. A. Pfefnbach



R. F. Myers



D. C. Cunningham



Ulric R. Jaeger

# Deburs 1520

1" TUBE ENDS PER HR.

on **PINES**  
END FINISHING  
MACHINE

Here's another outstanding example of how the Pines No. 600 End-Finishing Machine is setting records for production speed and efficiency. Today, at Configured Tube Products Company, Bellwood, Illinois, the Pines Machine (shown at right) performs inside and outside deburring on 1"

steel tubing at net production rates of 1520 tube ends per hour. Such high-speed production is made possible by the exclusive design of the Pines Machine which enables the operator to clamp and feed work to the rotating cutters in one pass, so that one hand is always free for rapid stock handling.



#### Exclusive Features Speed Work

Still other outstanding Pines features such as quick, interchangeable tool holders, chuck inserts, 8-speed sheave (760 to 3920 rpm), sturdy spindle, and grease-sealed precision bearings assure fast, accurate work. The Pines No. 600 handles chamfering, pointing, facing, and reaming operations, as well as deburring, on stock diameters up to 2". Maximum feed stroke is 1-1/4". Automatic air-operated units for higher production work, and larger sizes up to 5" capacity are also available.

**PINES** ENGINEERING CO., INC.  
Specialists in Tube Fabricating Machinery 698 WALNUT • AURORA, ILLINOIS

PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY

#### FREE BULLETIN

Write for facts on how these machines cut production costs.



## Changes in Sales and Service Personnel

Name	Company	To	Position
Arthur V. Baumann, Jr.	Lodge & Shipley Co. Cincinnati, O.	Same	Sales Promotion Manager
Robert M. Miller	John Oster Mfg. Co. Racine, Wis.	Onsrud Machine Works Inc. Chicago, Ill.	Sales Mgr., Woodworking Mach. and Portable Tool Div.
Louis W. Jander	Henry Disston Div., H. K. Porter Co., Inc. Philadelphia, Pa.	Same	General Sales Manager
John W. Breitmayer	Standard Pressed Steel Co. Jenkintown, Pa.	Same	Sales Mgr., Hollowell Collar Div.
Merrill C. Wilcox	Wales-Strippit Corp. North Tonawanda, N.Y.	Same	Advertising Manager



Polishing shaft bearing surface  
with Schauer Type NA2C Speed Lathe.

These versatile, low-cost machines handle an almost unlimited variety of work — deburring, lapping, trimming, polishing—on metal and plastic parts. Thousands in use. Many sizes and models with holding devices to suit the job. *Speed production* with Schauer Speed Lathes. Write for Catalog No. 530.

**SCHAUER MANUFACTURING CORP.**

4502 Alpine Ave. • Cincinnati 36, Ohio

Circle No. 345 on Card, Opposite Page 65



Robert M. Miller



L. W. Jander



John W. Breitmayer



Merrill C. Wilcox

## LESS DOWNTIME



THIS SET SCREW  
FAILED! WHY?



THIS MAC-IT KEY SHEARED  
CLEANLY! WHY?

### ... with Mac-it Socket Screws and Keys

The set screw failed because of (1) poor heat treatment *or* (2) use of a worn-out key. This failure caused delays and costly machine downtime for repairs.

The Mac-it Hex Socket Key twisted off with a clean, smooth shear because Mac-it planned it that way. The Mac-it Key drives a set screw to its maximum recommended tightening torque. Too much pressure on the key will *twist it off* before it can damage the screw. Mac-it's carefully controlled heat treatment provides the best combination of Socket Screws and Keys for failure-free fastening.

You save money when you rely on Mac-it Socket Screws and Keys—it is more economical to buy a new key than to lose production due to downtime. Ask your local distributor for free samples and literature, or write:

*Mac-it Screw Division*

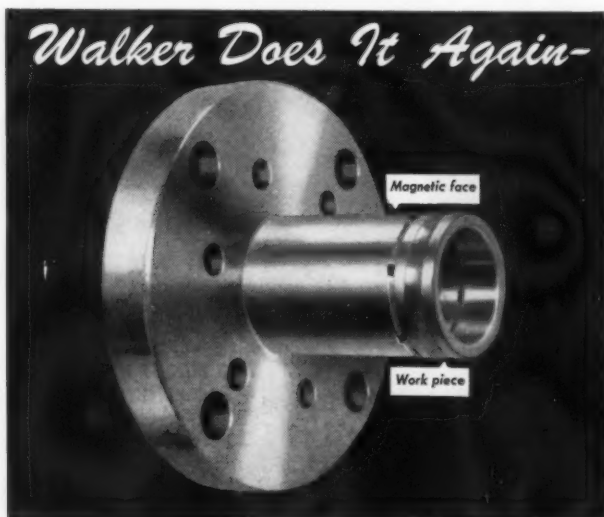
**STRONG, CARLISLE & HAMMOND COMPANY**

1392 West 3rd Street • Cleveland 13, Ohio

Circle No. 346 on Card, Opposite Page 65

## Changes in Sales and Service Personnel

Name	Company	To	Position
Joseph S. Geisinger	Wesson Co. Detroit, Mich.	Wesson Co. Cleveland, O.	Field Engineer
H. J. Dupuis	Chrysler Corp., DeSoto Div. Detroit, Mich.	Wesson Co. Detroit, Mich.	Field Engineer
Don Anderson	Whitman & Barnes Indianapolis, Ind.	Whitman & Barnes New York, N.Y.	District Manager
Joseph Rodecker	Whitman & Barnes San Francisco, Calif.	Whitman & Barnes Indianapolis, Ind.	Sales Engineer
Don Parker	Whitman & Barnes Los Angeles, Calif.	Whitman & Barnes San Francisco, Calif.	Sales Engineer
John J. Refieuna	Raybestos-Manhattan, Inc. Chicago, Ill.	Same	Sales Eng., Western District



### **Automation Requires:**

Magnetic Drivers (simple mounting). Magnetic Holding solves the problem for leading manufacturers of bearings. Again O. S. Walker pioneers with the production of a magnetic driver which adapts itself to bearings for automated operations involving high production.

*Whenever any holding device is needed,  
Walker engineers design and produce it.*

## O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

*Original Designers and Builders of Magnetic Chucks*

# KOPING

## HIGH SPEED LATHE 16½" SWING

# S 8 S

An outstanding example of Swedish precision craftsmanship. The S8S is only one of the great variety of Koping's lathes.

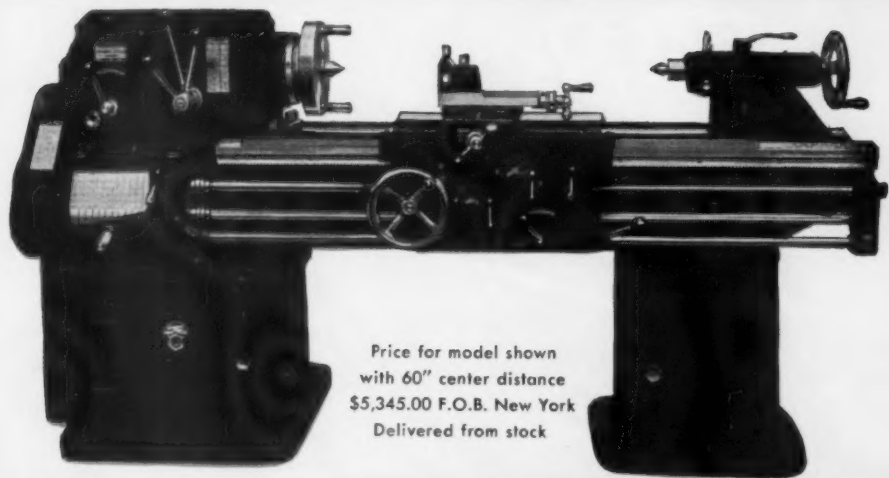
Write, outlining your needs, for complete details on the Koping lathe for your particular requirements.

### SPECIFICATIONS

Swing over bed .....	16½"
Spindle speeds, number .....	18
Spindle speeds in geometric progression.....	12.5-1000 r.p.m.
Thread pitches per inch threads, number .....	50
Threads per inch, range .....	2-68
Thread pitches for millimeter threads, number .....	26
Millimeter pitch, range .....	0.5-15 mm.
Motor .....	5 HP
Net weight w.o. motor .....	3950 lbs.

#### Extra equipment available

Cooling systems \* Cutting speed selector \* Load indicator \* Special tool posts \* Turrets \* Relieving attachments \* Taper turning and profiling attachments \* Feed stops, etc.



Price for model shown  
with 60" center distance  
\$5,345.00 F.O.B. New York  
Delivered from stock

**KOPINGS MEKANISKA VERKSTADS A.B.**  
**SWEDEN**

Circle No. 348 on Card, Opposite Page 63

**U.S. REPRESENTATIVE**

*Homestrand*  
INCORPORATED

**LARCHMONT, N.Y.**

Note: Dealer inquiries invited. Several territories available.

# **Why most drill manufacturers grind their 1/2 inch to 3 inch drills on Sellers grinders**



Drill points cut faster, drill through more inches of metal per grind and produce holes that are true cylinders of accurate size—when ground on a Sellers machine. Briefly, these are the reasons for the popularity of the Sellers grinder.

What's behind performance like this? Ground in a Sellers machine, the point is exactly in the center of the drill. Cutting edges are of equal length and at the same angle with the drill axis. Clearances back of the cutting edges are identical. In other words, the two lips of the point are exactly alike in size, shape and cutting action.

But there is more than perfect symmetry to the Sellers drill point. There is correct clearance back of the cutting edge—the kind that gives you fastest cutting with fewest grinds. Also important: The Sellers drill grinder automatically determines the proper clearance according to drill diameter.

Write for complete information about the Sellers drill grinder. Ask for Bulletin No. 4201.

**CONSOLIDATED MACHINE TOOL DIVISION  
FARREL-BIRMINGHAM COMPANY, INC.**

Rochester 10, N. Y.

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.

CM-6



ABOVE: The Sellers 6-GA drill grinder

LEFT: Close-up of the rocking-type chuck and the oscillating wheel head. (A) The adjustable center that engages the shank end of the drill. (B) and (C) the hardened jaws that engage the leading edges of the flutes just back of the cutting edges.

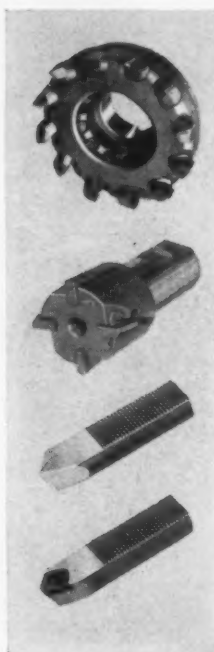
Circle No. 349 on Card, Opposite Page 65



## Changes in Sales and Service Personnel

Name	Company	To	Position
Alton L. Gray	Pfaudler Co. Rochester, N.Y.	Same	Asst. Gen. Sales Mgr.
Edgar N. Fox, Jr.	Pfaudler Co. Rochester, N.Y.	Same	District Sales Mgr.
Robert C. Silver	Pfaudler Co. Rochester, N.Y.	Same	Field Sales Engineer
Walter J. Mollenauer	Jessop Steel Co. Washington, Pa.	Vulcan Crucible Steel Div., H. K. Porter Co., Inc. Aliquippa, Pa.	Administrative Salesman
Zane H. Markley	F. J. Leonard Co. Denver, Colo.	Kennametal Inc. Latrobe, Pa.	Sales Rep., Denver area

***Look into the complete, cost-cutting LOVEJOY line.  
Standard tools are in stock – to help you  
increase production, save time and money now!***



### **INSERTED-TOOTH MILLING CUTTERS**

Face, side, end, slotting and boring mills.

### **H. S. S., CARBIDE, ALLOY BLADES**

Interchangeable in all Type "A" milling cutters from 4½" to 24" in diameter.

### **NEW! SET-SCREW TYPE END MILLS**

And new Type "Z" slotting cutters provide maximum axial and radial adjustment.

**Boring Tools • Arbors • Flywheels  
Lovejoy Milling Cutter • Assembly Gage**

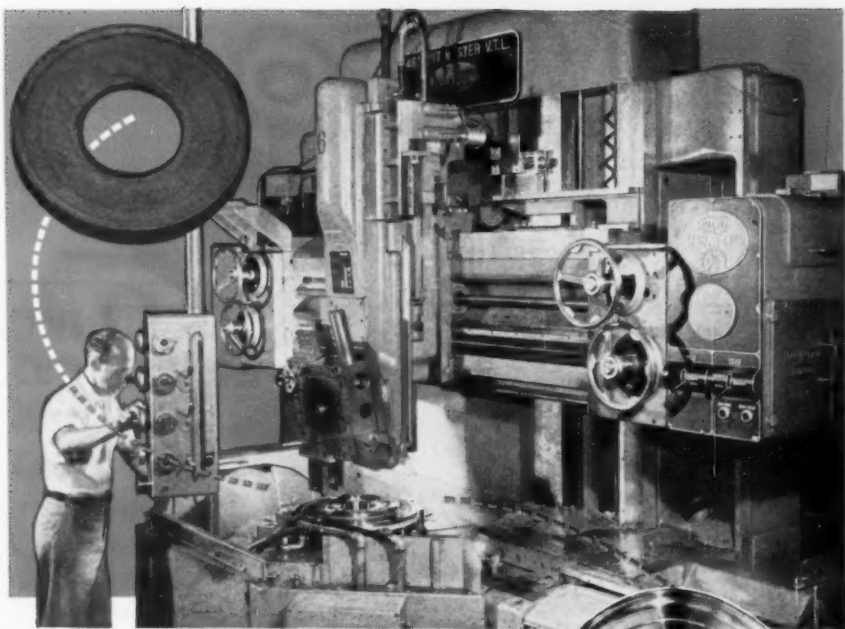
***Special cutters are a Lovejoy specialty***

Write for new catalogs: No. 31 (Face Mills),  
No. 32 (Side Mills), No. 33 (Arbors).

**136 MAIN ST., SPRINGFIELD, VERMONT**

**Send for free  
SPEED & FEED  
CALCULATOR**

**LOVEJOY** *Ltc*  
**TOOL COMPANY, INC.**  
SPRINGFIELD, VERMONT, U. S. A.



"To produce quality parts in quantity . . .

## Nothing beats Man-Au-Trol"

This statement by Mr. W. Mason Williams, Manufacturing Manager of the Jet Division, Thompson Products Inc., Cleveland, Ohio, is based on ten years of experience with Man-Au-Trol.

"If it hadn't been for Man-Au-Trol" Mr. Williams continues, "we would still be turning out aircraft engine components on manually-operated machines. Man-Au-Trol, particularly when tooled with better cutting tools, has enabled us to turn out at least five times as many compressor disc and turbine discs per shift as we produced on hand-operated equipment."

You, too, can apply to your machining problems the many advantages offered by Man-Au-Trol, Model 75 — just call your nearest Bullard Sales Office, Distributor or write for catalog to

**BULLARD**

# THE BULLARD COMPANY

BRIDGEPORT 9, CONNECTICUT

## Changes in Sales and Service Personnel

Name	Company	To	Position
James Keough	Scully-Jones & Co. Chicago, Ill.	Scully-Jones & Co. Ohio area	Sales Engineer
Elmer B. Dunkak	Selas Corp. of America Philadelphia, Pa.	Same	Vice-President, Sales
L. C. Maefs		National Automatic Tool Co., Inc. Los Angeles, Calif.	Sales Engineer
K. Weist		National Automatic Tool Co., Inc. Detroit, Mich.	Sales Engineer
H. Midesell		National Automatic Tool Co., Inc. Detroit, Mich.	Sales Engineer
Erich Gobien	Kurt Orban Co., Inc. Jersey City, N.J.	Same	General Methods Engineer

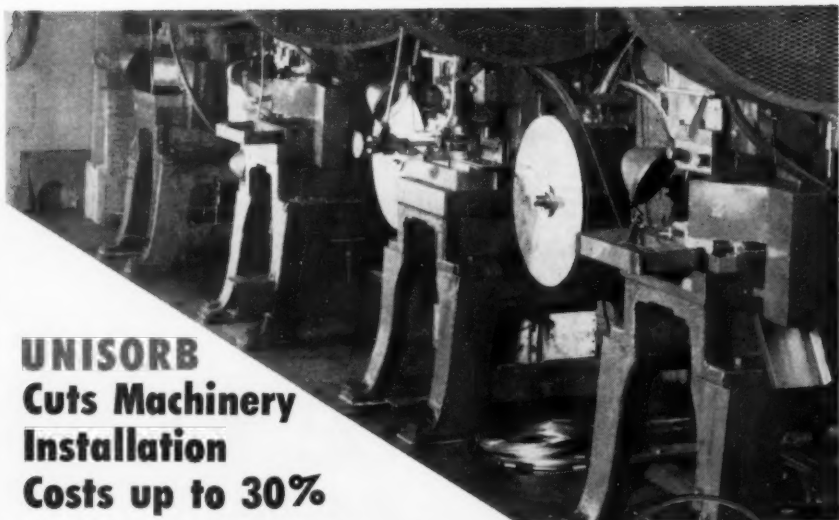
**WORLD'S  
HARDEST METAL**

● New, improved TALIDE METAL is uniform in quality—gives top performance on ALL cutting, drawing and wear-resistant applications. Write for Catalog 56-G. METAL CARBIDES CORP., Youngstown 12, Ohio.

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YOUNGSTOWN 12, OHIO

HOT PRESSED AND SINTERED CARBIDES • VACUUM METALS  
HEAVY METAL • CERMETS • HIGH TEMPERATURE ALLOYS  
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

Circle No. 352 on Card, Opposite Page 65



## UNISORB Cuts Machinery Installation Costs up to 30%

It's always surprising how much you can save by mounting your machinery on Unisorb. Here are the four big money savers:

- Forget about bolts and lag screws. No holes to drill, legs to center, floors to be patched.
- Save up to 30% on labor and materials.
- Heavy machinery can be on the job in hours — saves up to 80% on installation time.
- Unisorb holds for keeps, yet can be unbonded when required. No maintenance, no checking required.

All this plus the ability of Unisorb to reduce transmitted vibration by as much as 85%!

Get this FREE book. Take advantage of this cost saving the next time you have a machine to install or move.



FE6-7

*The name to remember is...*

# UNISORB

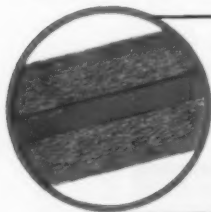
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Manufacturers of Felt and Felt Products

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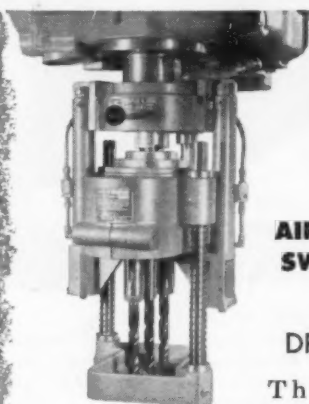
Send for FREE "Facts" Booklet

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Company .....  
Street .....  
City ..... Zone ..... State .....



## Changes in Sales and Service Personnel

Name	Company	To	Position
Jack A. Heath	Norton Co. Worcester, Mass.	Norton Co. Los Angeles, Calif.	Field Engineer
E. B. Pesok	Osborn Mfg. Co. Cleveland, O.	Osborn Mfg. Co. New York, N.Y.	District Manager
P. A. Malling	Osborn Mfg. Co. Los Angeles, Calif.	Same	District Manager
J. H. McGinnis	Osborn Mfg. Co. Detroit, Mich.	Same	District Manager
C. William Newman	Osborn Mfg. Co. Cleveland, O.	Same	District Manager
R. J. Wickes	Lincoln Electric Co. Cleveland, O.	Solar Steel Corp. Cincinnati, O.	Sales Mgr., Bar & Tube Prod.
Maurice Schrager		Syntron Co. New York, N.Y.	Salesman



## NEW DRILL HEAD

### AIR COUNTERBALANCE SWIVEL ATTACHMENT

### FOR RADIAL DRILLING MACHINES

This new combination Swivel and Air Counterbalance attachment makes it possible to adapt large multiple spindle drill and tapping heads to radial drilling machines. Flexible and easily adjusted, it insures maximum safety for the operator, as well as better operating economy.

Attachment includes air filter, pressure regulator, and an air oiler, and incorporates a 360° swivel feature fully aligning the drill head. It operates equally well with the fixed center type head and the adjustable type head.

This package is ideally suited for drilling condenser plates, boiler tube sheets, flue sheets, etc.

Manufacturers of all types of Fixed  
Center, Adjustable, and Individual  
Lead Screw Tapping Heads



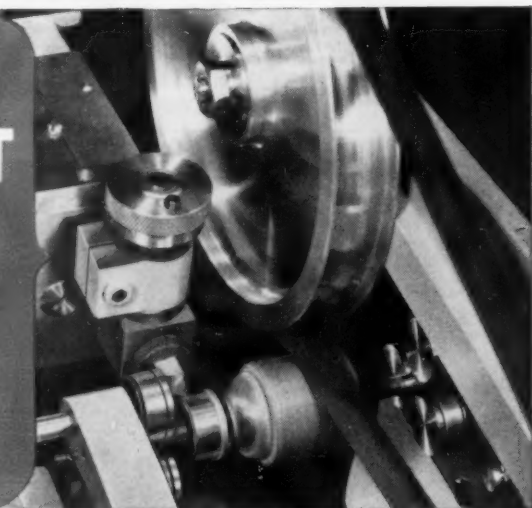
**THE UNITED STATES DRILL HEAD COMPANY**

616-618 BURNS STREET • CINCINNATI 4, OHIO

Circle No. 354 on Card, Opposite Page 65

# turn armatures faster, more accurately

with the  
**RIVETT  
IAL**  
armature  
turning  
lathe!



**concentricity** Held to .0002". Commutator turned while armature revolves on its shaft as in normal use. Depth and length of cut performed automatically.

**finish** Assured by rotating the armature at 7000 r. p. m., and turning with diamond or carbide tool.

**speed** Achieved by simple, quick method of mounting armature between two supports, bringing armature to top speed, and automatically taking cut!

**Get all production facts!**

11 sec. tray to tray operation described  
in bulletin IAL. Write for copy today!



**RIVETT**

**RIVETT LATHE & GRINDER, INC.**  
Dept. MTR-11, Brighton 35, Boston, Mass.

## Changes in Sales and Service Personnel

Name	Company	To	Position
Austin L. Hawk	Raybestos-Manhattan, Inc. Chicago, Ill.	Same	Manager, Western Sales District
J. B. Wittrup	Raybestos-Manhattan, Inc. Chicago, Ill.	Has retired from his position as Western District Manager	
Donald J. Vala	Rotor Tool Co. Cleveland, O.	Same	Advertising Manager
James Sklenar	Scully-Jones & Co. Chicago, Ill.	Scully-Jones & Co. Wisconsin area	Sales Engineer
Harry Galvin	Scully-Jones & Co. Chicago, Ill.	Scully-Jones & Co. New England area	Sales Engineer

Now you can

# PRODUCE FASTER FOR LESS

with this 100-ton  
**FEDERAL**  
air-clutch press



No. 8 Genr Type

These modern Federal Presses have what it takes to step-up production and cut unit costs! Their safe, precision, fatigue-free operation at high speeds may be attributed to the fast-acting clutch plus other outstanding features. Dual-solenoid safety valve. Non-repeat mechanism. "Inching" control. Continuous as well as single-cycle operation. In 6.6 to 100-ton capacities. Write for new catalog showing complete line.

**FEDERAL PRESS COMPANY**  
610 Division St., Elkhart, Ind.

**FEDERAL** *Open back  
Inclinable* **PRESSES**  
31 Years of Quality Construction

Circle No. 356 on Card, Opposite Page 65



**tap more**

*Accurate.*

**pieces per hour  
with a PROCUNIER  
TAPPING HEAD!**

There's a definable *extra quality* built into each Procunier tapping head that is automatically reflected in the work produced. Procunier heads are precision units—embodying the most advanced engineering improvements. In shop after shop—on job after job—the reaction is the same—"Procunier heads are producing *better, faster, longer*, with fewer rejects, fewer spoiled pieces."

The answer lies in the manufacturing know-how which has made Procunier heads synonymous with superior quality in the industry. Here are just a few "reasons why" Procunier excels everywhere; New double cone cork faced friction clutch assures positive "controlled" drive with finger tip sensitivity, soft cushioned driving pressure means longer tap life and greater accuracy, ball bearings for smoother, faster operation; heat treated gears reduce strain, wear, and eliminate tap wobble, during high speeds; special balanced gear reversing mechanism, plus many others. It all adds up to more production, better production, for longer periods, for less.

**Write for the FREE Brochure—**

giving full details and specifications on the Procunier line of tapping heads and how you can adapt them to your specific needs.

**PROCUNIER  
SAFETY CHUCK CO.**

Dept. 14

14 S. Clinton St., Chicago 6, Ill.



**\*EXCLUSIVE!  
Tru-Grip  
Tap  
Holder**

lighter, smaller,  
means easier  
tapping close to  
walls and  
shoulders.

**PROCUNIER SAFETY CHUCK CO.,  
14 S. Clinton St., Chicago 6, Ill. Dept. 11**

Gentlemen: Please send your **FREE** illustrated brochure.

Name .....

Address .....

City..... Zone..... State .....

Circle No. 357 on Card, Opposite Page 65

# You Can be Sure of 2 WAY BENEFITS

# PRODUCTION PROFITS

*When You Use*

**DPS**

**POWER SCREWDRIVERS**  
and other Assembling Equipment

Present Owners Report a  
**SHARP GAIN** in OUTPUT  
and a **RISE** in PROFITS!

*Important  
Reasons*

why you, too, should benefit from greatly stepped-up, lower-cost production and the wider profit margin that naturally follows . . . These 2-way advantages of DPS Power Methods have been proved in over a quarter century of service to modern industry . . . If you are still using out-moded assembling methods, change now . . . Get the facts about the extensive DPS line. No doubt we have a product that can be adapted to your requirements. Write today.



**BOWL FEEDER**

Vibratory type, to select and feed smaller fragile parts

**DPS**

**SELECTIVE  
PARTS FEEDERS**

### **Modern Necessities Widely Adaptable**

These versatile devices not only provide the feeding operations on Detroit Power Screwdrivers, but they are being widely used on today's many special high-production machines.

**WHAT IS YOUR FEEDING AND ASSEMBLING PROBLEM?  
WRITE US—ALSO SEND SAMPLE ASSEMBLY**



**5 SCREW-  
DRIVING  
MACHINES**

Bench and Pedestal types. Pedestal Model A pictured

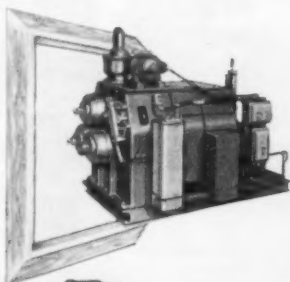
## DETROIT POWER SCREWDRIVER CO.

2809 W. FORT ST.

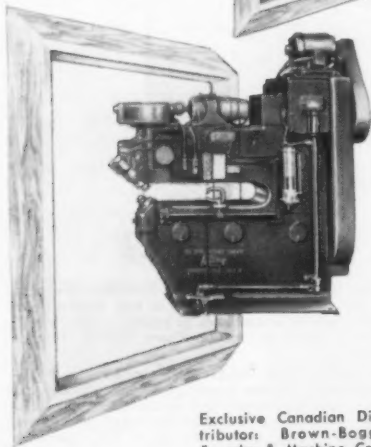
DETROIT 16, MICHIGAN

# For Data On These And Other **COST CUTTING** Kling Metal Working Machines WRITE FOR BULLETIN 100

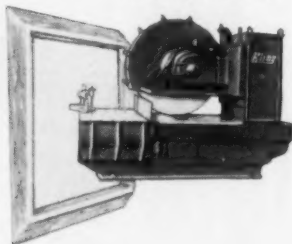
BENDING ROLLS  
Angle (illustrated)  
and Plate



SHEARS:  
Rotary (illustrated),  
Double Angle  
and Guillotine



High Speed  
FRICTION SAWS



In "the best of companies"  
Kling Machines are increas-  
ingly installed for their labor-  
saving, improved production  
and savings. For illustrated  
descriptions and data repre-  
senting over 50 Kling Ma-  
chines, write for your Free  
Copy of new Complete Line  
Bulletin 100.

Exclusive Canadian Dis-  
tributors: Brown-Boggs  
Foundry & Machine Co.,  
Ltd., Hamilton, Ont.

Since 1892

# **Kling**

**KLING BROS. ENGINEERING WORKS**  
1320 North Kostner Avenue, Chicago 51, Ill.  
Export Distributor: Simmons Machine Tool Corporation  
50 E. 42nd St., New York 17, N. Y.

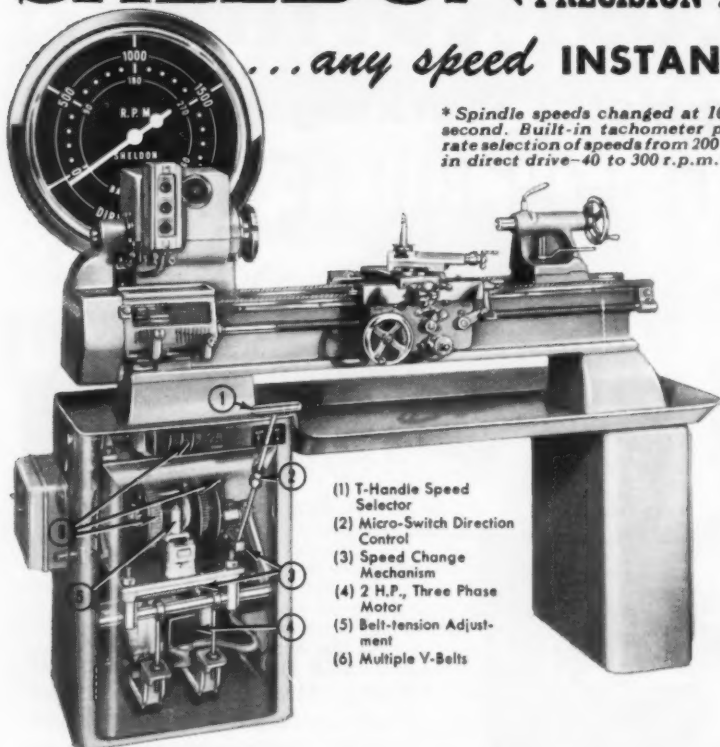
Makers of Friction Saws; Shears; Punches; Com-  
bination Shear, Punch and Coper; Angle and Plate  
Bending Rolls; Power Bar Benders; Bulldozers,

Circle No. 359 on Card, Opposite Page 65

# SHELDON *Variable Speed* PRECISION LATHES

*...any speed INSTANTLY\**

*\* Spindle speeds changed at 100 r.p.m. per second. Built-in tachometer permits accurate selection of speeds from 200 to 1800 r.p.m. in direct drive—40 to 300 r.p.m. in back gear.*



- (1) T-Handle Speed Selector
- (2) Micro-Switch Direction Control
- (3) Speed Change Mechanism
- (4) 2 H.P., Three Phase Motor
- (5) Belt-Tension Adjustment
- (6) Multiple V-Belts

This new lathe instantly meets every changing speed requirement in the tool room, or quickly sets and holds to any prescribed speed for production runs.

**Rugged, Heavy-duty Variable Speed Drive**—an oversized unit with double V-belts throughout that delivers positive full-power to the spindle.

**High Spindle Speeds**—from 200 r.p.m. to 1800 r.p.m. (direct drive), from 40 r.p.m. to 300 r.p.m. in back gear.

**Instant and Automatic (power driven) Speed Selection**—Only 9 seconds to change from low to high speeds in either direct drive or backgear. Speeds are changed automatically when T-handle is lifted or pushed into engagement.

**High Horsepower at All Speeds**—Because the drive unit is oversized, it has larger belts which deliver maximum gripping power at all speeds. A 2 H.P., three Phase motor recommended.

Additional lathe features: Zero Precision tapered roller spindle bearings, 54 pitch gear box, heavy cast pedestal, tool-room accuracy. Optional accessories include hardened bed ways, L00 long taper key drive or 4" D1 Camlock spindles.

Sheldon Precision Variable Speed Drive Lathes are available in 11" or 13" Swing, Model WM-56-P (Illustrated) less motor and switch, \$1,944.00 F.O.B. Chicago. Other 10", 11", and 13" Sheldon Precision Lathes from \$832.00 up. Also 13" and 15" Sebastian Geared Head Lathes, Sheldon Milling Machines and Sheldon Shapers.

Write for Catalog

**SHELDON MACHINE CO. INC.** 4242 N. KNOX AVE. CHICAGO 41, ILL.

Circle No. 360 on Card, Opposite Page 65

## WHAT'S NEW IN METALWORKING

MACHINE AND TOOL

blue book

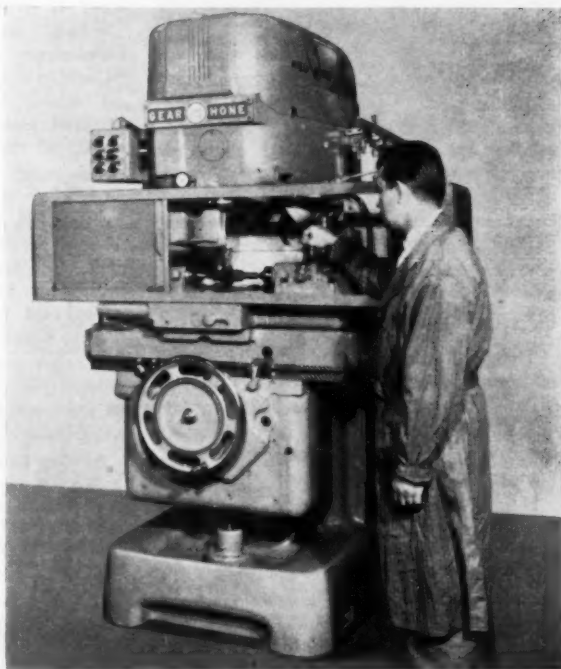
Edited by D. M. Carlson

### Gear Tooth Honing Process Improves Sound Qualities of Gears

A new Red Ring process that applies honing principles to the finishing of hardened gear teeth to improve sound characteristics has been developed by National Broach & Machine Co., Dept. JS, 5600 St. Jean, Detroit. It removes nicks and burrs, corrects small heat-treatment errors in spacing, profile lead or eccentricity, and improves surface finish.

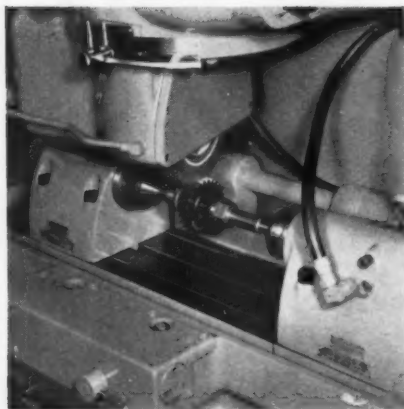
To carry out the tooth honing process, the company has developed two models of high speed Red Ring gear hone machine tools that operate in conjunction with a new gear tooth honing tool.

Model GHA gear hone is equipped with an automatic loader. Gears are honed under low-backlash operating conditions with optional brake loading. Head and tailstock spindles can rotate up to 3000 revolutions per minute. Mist lubrication provides a flushing action that assures continuous cleanliness of the precision spindle bearings.



Model GHB Red Ring gear hone arranged for manual loading of an automotive transmission helical gear.

Model GHB universal gear hone is used when more tooth correction is desired. This machine may be adapted to manual, semi-automatic or fully



Closeup view of the Model GHB.

automatic loading arrangements. When arranged for manual or semi-automatic loading, gears up to 8" pitch diameter can be honed. Gears up to 3" pitch diameter can be honed when the machine is equipped for fully automatic loading. Crown honing operations can also be performed on the machine.

Use ACTION Card, opposite page 64. Circle No. 81

## Wheel is heart of process

The gear honing process relies for its effectiveness on a honing tool which is essentially an abrasive-impregnated helical gear that is run at high speed in mesh with the hardened gear in crossed axes relationship.

Before the present honing tool (let's call it a wheel for purposes of present discussion) was developed, a number of alternate methods had been tried with no success. A standard abrasive wheel, for instance, couldn't be used. While the abrasive wheels could be formed with teeth, these tooth forms broke when meshed with the gears at the high speed necessary for the gear honing process.

The present wheel is a form of plastic impregnated with silicon carbide. The wheel is formed in a master of the same shape as the final wheel, which is ac-

curate within tenths of the master. It may be assumed the master mold is of the same material as the wheel. Somewhere along the line the wheel is "cooked." Understandably, National Broach is reluctant to divulge too much information about the wheel's manufacture at the present time.

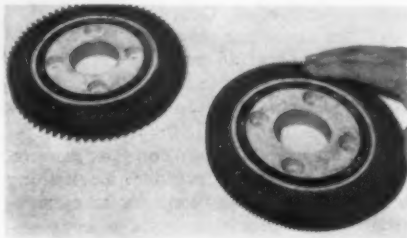
The wheel appears to clean itself as it meshes with the gears being honed; wear is even. It generates itself and continually presents the same form to the gear. Theoretically, the wheel will last down to the smallest practical stub without care or dressing. No studies have been made regarding wheel life. On heavy stock removal operations performed on an experimental basis, sand blasting is used for cleaning. There is no wheel loading when honing carburized gears. No studies have been made, at this writing, on cast gears.

Inasmuch as the honing of gears is to remove nicks and burrs in an effort to improve sound qualities, the amount of metal removed is of no major concern. On test runs, however, .003" of metal was removed at one time on 100 gears and no detrimental wear effect on the wheel was observed.

Wheels are furnished in varying grits; a 10 micro finish is obtainable with an 80 grit wheel. Finish naturally varies with the grit of the wheel.

At the present time, officials of Na-

Two gear honing tools. The amount of helix angle on the teeth of the abrasive-impregnated tools depends upon the helix angle of the work gear and the amount of crossed axes angular setting.



# ATTACHMENTS for *Bridgeport* TURRET MILLING MACHINES *add outstanding versatility to a machine already versatile*

When you buy the BRIDGEPORT TURRET MILLING MACHINE, you buy more than a conventional vertical milling machine. You actually buy and get a machine of a type conceived, created and developed by Bridgeport. In addition to the turret principle originated by Bridgeport, attachments have been designed which add a great many features to the machine so that its basic purpose for milling, drilling, boring and shaping has been extended to include also churning, right angle milling as well as copying with the Bridgeport Hydraulic True Trace Combination.

One of the outstanding advantages of this machine is that you can buy this basic machine with some or all of these attachments or add them later whenever the need arises for the handling of specific operations.



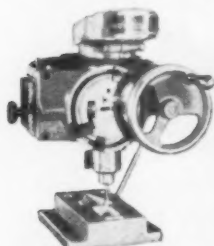
**RIGHT  
ANGLE  
ATTACH-  
MENTS**



(Above). Heavy Duty . . . for milling and drilling at right angles; fits both Master and 1 HP Bridgeport Heads.



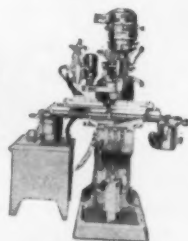
(Above) Light duty . . . for right angle milling and drilling narrow, deep molds and cavities.



**CHURNING  
ATTACHMENT**

Makes possible production of convex and concave shapes. Ideal for producing drop forge dies, molds, cavities.

Investigation of Bridgeport Milling Machines and their many attachments is always in order.

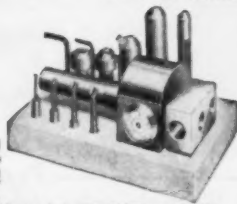


**TRUE TRACE  
COMBINATION**

The Bridgeport True Trace Combination will give excellent performance and save endless hours when copying irregular dies and molds.

**No. 2  
BORING  
HEAD**

Boring Tools and Holder provide means for boring holes up to 6" diameter; available for use on Bridgeport 1 HP Milling, Drilling and Boring Attachment.



## *Bridgeport* MACHINES, INC.

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines



WHEN YOU'RE DEALING WITH PRECISION IN MILLIONTHS . . .

DEPEND ON **FONDA**

**ULTRA** *finish*

## **GAGE BLOCKS**

SQUARE OR RECTANGULAR

IN STEEL OR CARBIDE

WITH ACCESSORIES



**Precision in  Millionths**

When the order calls for pinpoint accuracy, there can be *no* margin for error! That's why Fonda *Ultra-Finish* gage blocks . . . painstakingly developed and precision engineered . . . guarantee *you* gaging closest to perfection. *Compare!* You'll find Fonda gage blocks and accessories, both price and tolerance-wise, are the *finest* your money can buy! Write *now* for literature and the name of our representative in your area.

**D. C. FONDA GAGE CO.**  
203 HENRY ST., BOX 1050, STAMFORD, CONN.

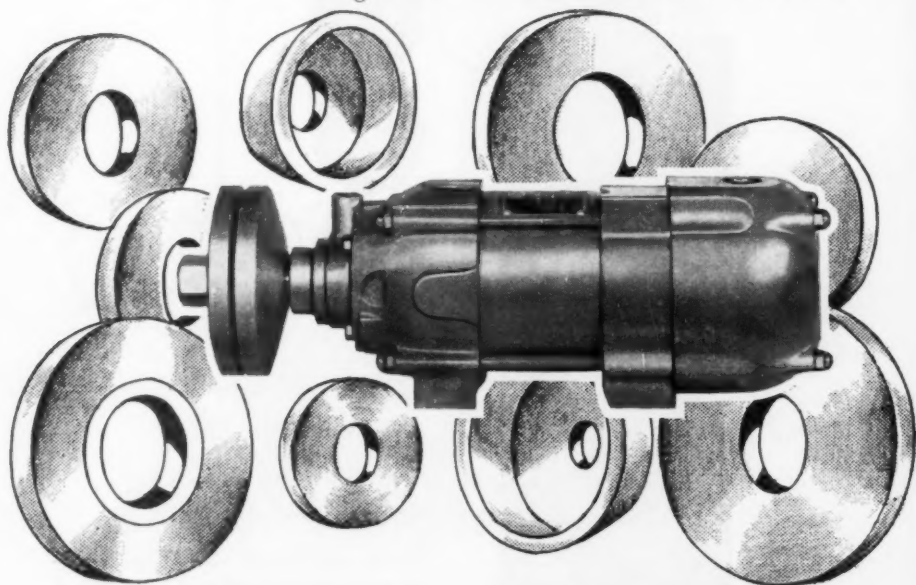
Circle No. 362 on Card, Opposite Page 65

*Serving the Industry Since 1852*



## **POSITIVE POWER**

with a **WOODS MOTOR ARBOR**

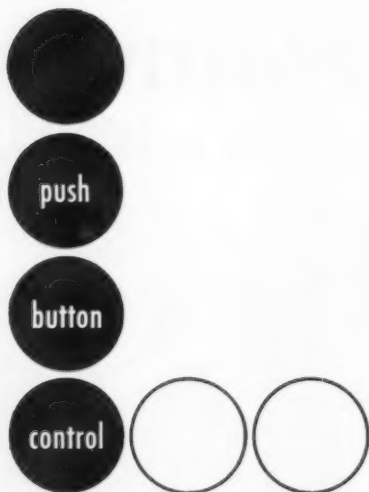
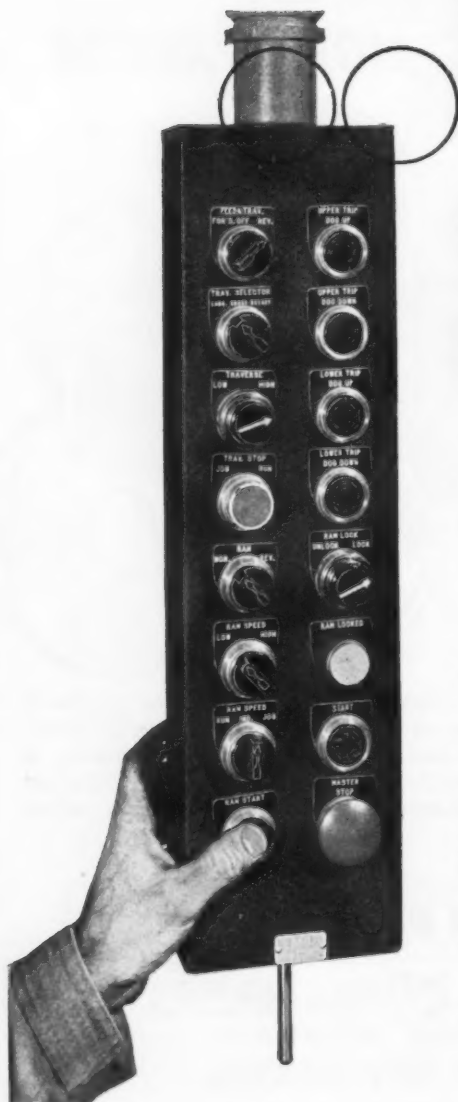


Precision built and "tape insulated," WOODS motors are available in a wide variety of types and range from one to one hundred horsepower. Extremely adaptable for use requiring precision balance, a minimum of space and delivering the maximum of power. Why not investigate the advantages of these time-and-money saving motor arbors for your plant today?

Send for descriptive material

**MOTOR DIVISION**

**S. A. WOODS MACHINE CO.**  
27<sup>th</sup> DAMRELL STREET  
**BOSTON 27, MASS.**



### speeds operation and set-up on new Rockford **hydraulic slotter**

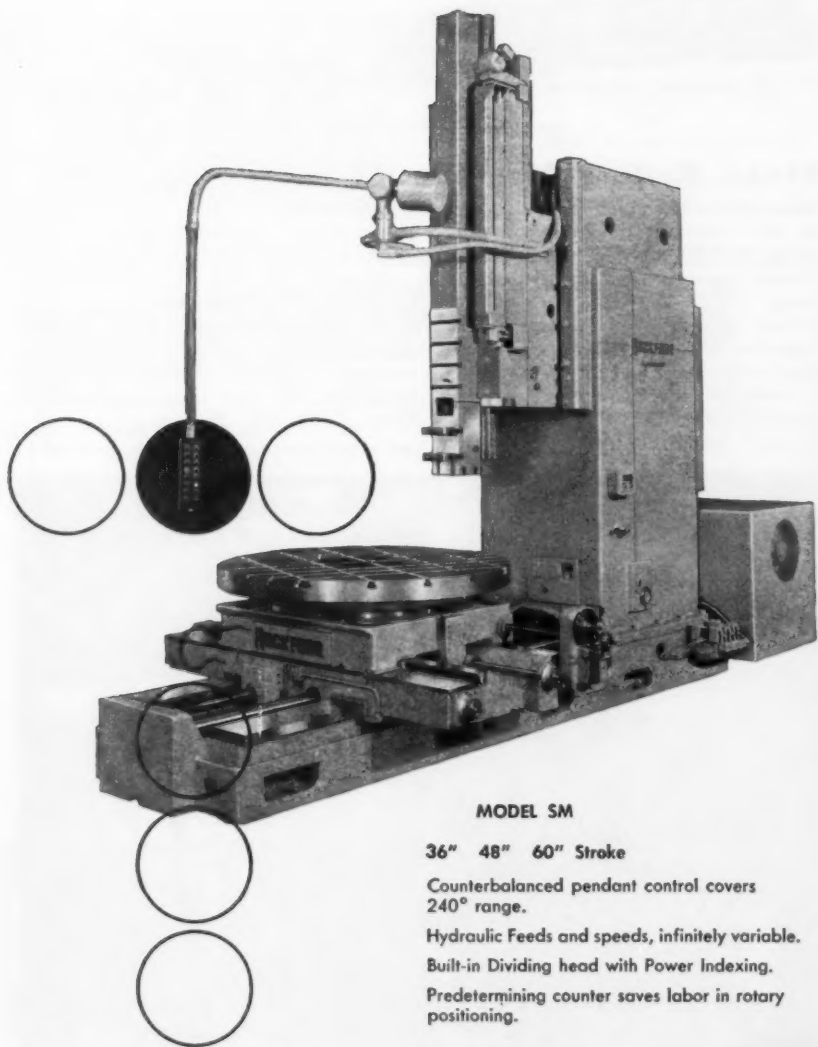
All longitudinal, transverse and rotary movements are selected and operated from the push button station of this new Rockford hydraulic Slotter.

The ram lock is pendant operated and ram stroke length and position are completely push button controlled.

Two-speed table traverse is available, enabling the machine operator to position the work to a few thousandths, without manual movements, although manual control of all movements is available from either side of the machine.

Full hydraulic drive provides two cutting ranges, one for high speeds and low cutting forces; the other for slow speeds and heavy cuts.

Get full details on this new hydraulic slotter from any Rockford Machine Tool Co. representative, or write directly to us.



#### MODEL SM

36" 48" 60" Stroke

Counterbalanced pendant control covers 240° range.

Hydraulic Feeds and speeds, infinitely variable.

Built-in Dividing head with Power Indexing.

Predetermining counter saves labor in rotary positioning.

**ROCKFORD MACHINE TOOL CO.**  
2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS



**HYDRAULIC**

tional Broach say there is no thought of entering the wheel manufacturing field with standard wheels or hones for

finishing operations. The wheel will be used only in conjunction with their new gear honing machine.

Use ACTION Card, opposite page 64, Circle No. 92

## Thread Rolling Machine

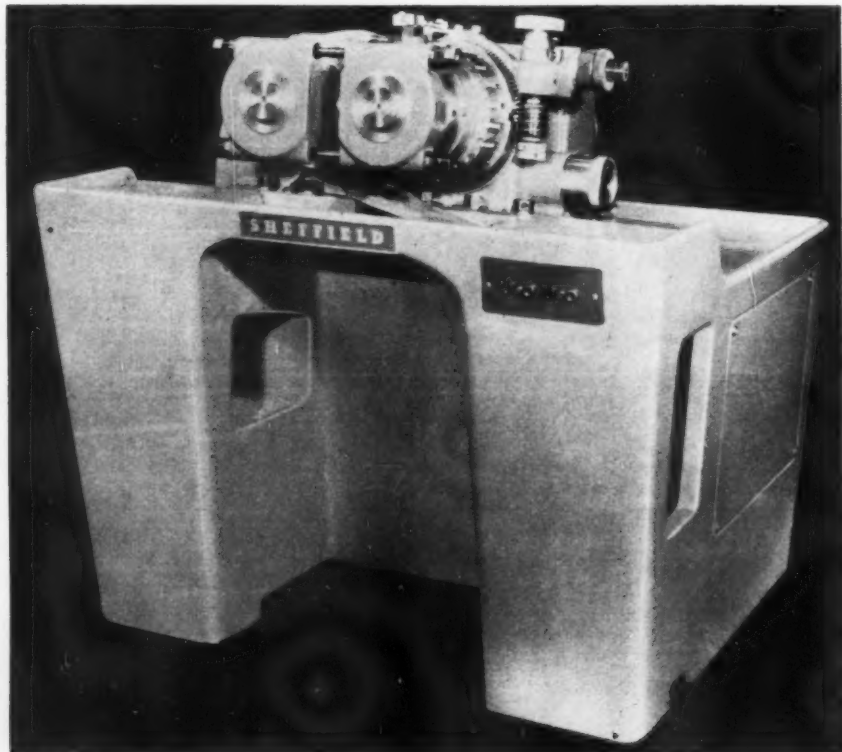
Equipped with hopper feed, this circular roll threading machine will produce up to 5200 parts per hour, ranging in thread size from  $\frac{1}{8}$ " to  $\frac{3}{4}$ " o.d. by 2" long.

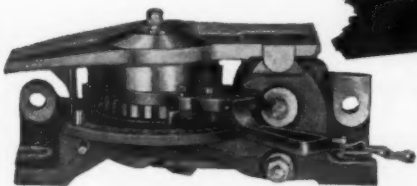
Rolling is performed by two interchangeable and reversible precision ground rolls rotating at different speeds and mounted on heavy duty roller bearing spindles. Drive is by positive worm and wheel control, powered by

a  $7\frac{1}{2}$  hp motor. The machine has no cams, slides, hydraulic systems, fixed work rests, or reciprocating motions.

Parts are fed tangentially between the rolls by a revolving work feeder ring, falling free after rolling down a chute to a container. The feeder ring can be magazine loaded, manually or automatically. Murchey Div., The Sheffield Corp., Dept. RH, Dayton 1, O.

Use ACTION Card, opposite page 64, Circle No. 93





**1200 PIECES  
PER HOUR**



1,200 light cuts per hour.  
Either horizontal or vertical positions.  
Collets changed instantly.  
Efficiency assures economy.

## Automatic Chucking and Indexing Fixture

### Features:



- Work held by collets.
- Automatic opening & closing.
- Work automatically ejected.
- Automatic indexing if required.
- Three models with capacities from 1/32" to 2"

*(Write for illustrated data.  
Send blueprints or specifications of work)*

**J. W. DEARBORN**  
72 CLIFF ST.  
ANSONIA • CONN.

Circle No. 366 on Card, Opposite Page 65

...precision  
and power for  
high production

**SKINNER**  
POWER CHUCKS

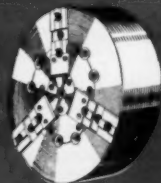


THE CREST OF QUALITY

THE **SKINNER**

**CHUCK COMPANY**

207 Edgewood Ave., New Britain, Conn.



Accurate, safe, dependable, fast! Sizes, 6" to 24" with forged steel bodies, 2 and/or 3 adjustable, non-adjustable or serrated jaws. Power chuck available in 2- and 3-jaw compensating models for holding rough castings and forgings between centers. Double-acting rotating air cylinders available for all Skinner power chucks.

Write for free catalog and for showings of film, "Chucks and Their Uses".

## File has double-sided blade

The Tresa universal file, made in Sheffield, England, has a double-sided blade which can be used on all ferrous and nonferrous metals, plastics, synthetics, leather, rubber and wood.

On each side of the blade there are sharp, specially hardened cutting edges. The slot-like openings between the



edges do away with clogging by filings or dirt. Thus, there is no need to stop to clean it—a special advantage when working with soft materials and brake linings. It is also handy as a sharpening tool.

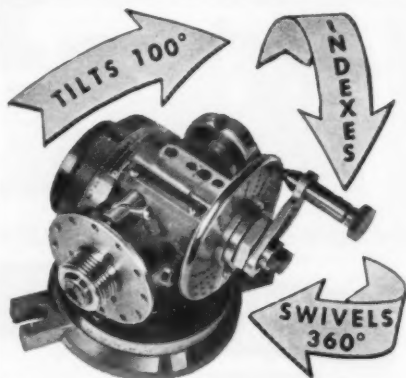
File will not leave traces on the work-piece. A polished surface results. Distributed by the Bradley Machinery Co., Dept. JS, 23440 Woodward, Ferndale, Mich.

Use ACTION Card, opposite page 64. Circle No. 84

### REPRINTS AVAILABLE

The following reprints are available from MACHINE & TOOL BLUE BOOK, 222 E. Willow Ave., Wheaton, Ill. Send for your free copy today.

1. **Flexible Reinforced Wheels**  
by Richard C. Bush.
2. **How Douglas Solved Its Deep Hole Drilling Problems**  
by A. R. Felando.
3. **"Bouncing Ball" Method of Indication Inspects Irregular Cam Contours.**



FOR FASTER PRODUCTION

## THE ELLIS

### DIVIDING HEAD

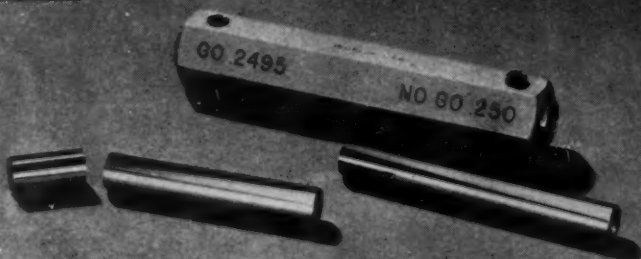
Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions—swiveling in two planes—will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

**N**  
**NICHOLS MORRIS**  
**M**  
CORPORATION

76-G MAMARONECK AVE.  
WHITE PLAINS, N. Y.

Circle No. 368 on Card, Opposite Page 63



**K****WIRE TYPE PLUG GAGES****VASTLY LONGER-LIVED AND MONEY-SAVERS****BECAUSE THEY'RE "CUT-OFF-ABLE" AS WELL AS "REVERSIBLE"**

As a Van Keuren agent put it, "They're not only reversible, they're cut-off-able." And that means when you buy Van Keuren Wire Type Plug Gages, the sizes below  $\frac{3}{8}$ " may be cut off when ends become worn and as many as from five to ten gages made available from the  $1\frac{1}{8}$ " and 2" long units. It is not only economical and practical to use Van Keuren Gages but it is a very simple operation to cut off the ends by following instructions furnished on request. The illustration above shows clearly the cut-off and reversible features.

VK Wire Type Gages are available in ZZ to XXX accuracies in sizes from .001" to 1.000". They are furnished in alloy tool steel, high speed steel, chromium plate or tungsten carbide. Whatever the gaging job, the extra length provided in VK units will save you money. It will also pay you to take advantage of VK deliveries. In many cases we can ship your requirements from stock.

VK Wire Type Plug Gages are fully described in Catalog & Handbook No. 36, available on request.

Send for a copy of the new, 258-page Van Keuren Catalog and Handbook No. 36 containing valuable technical and engineering information on measuring problems and methods. Address:

**VK**

37th YEAR

THE *Van Keuren* CO.

**177 WALTHAM STREET, WATERTOWN, MASS.**

Optical Flats . . . Light Wave Equipment . . . Light Wave Micrometers . . .  
 Gage Blocks . . . Wire Type, Taperlock and Trilock Plug Gages . . . Master  
 Setting Disks . . . Thread Measuring Wires . . . Gear Measuring Wires . . . Carbide  
 Plug Gages . . . Laps and Surface Plates . . . Precision Lapping Service.

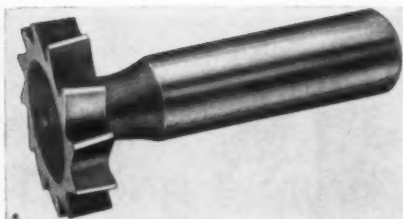


Circle No. 369 on Card, Opposite Page 63

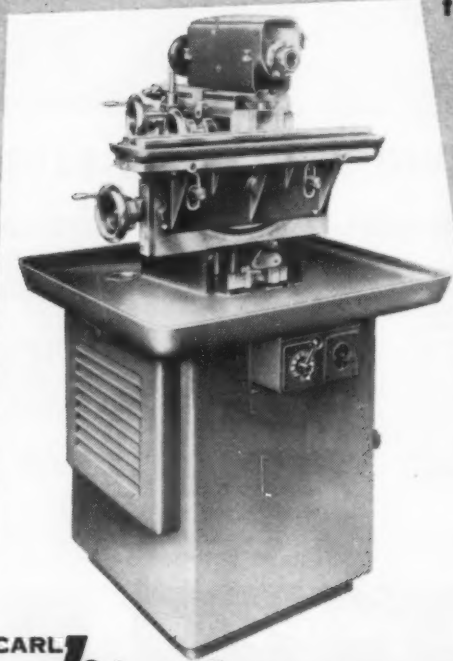
### Stagger tooth cutters

Stagger tooth Woodruff keyseat cutters are made of high speed steel and are made dimensionally like a conventional Woodruff cutter, but the teeth are gashed on alternate right hand and left hand 10° angles. Shear cutting action cuts more freely, producing less friction and heat, long cutter life.

They are particularly helpful in cutting tough, hard to cut materials such



as high alloy steels, heat treated shafts, stainless steel. Smoother cutting action,



CARL

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CO., INC. 30 PARK AVENUE, MANHASSET, N. Y.

LOS ANGELES • MILWAUKEE • CHICAGO • DETROIT

largest selection of Swiss high-precision machine tools in America

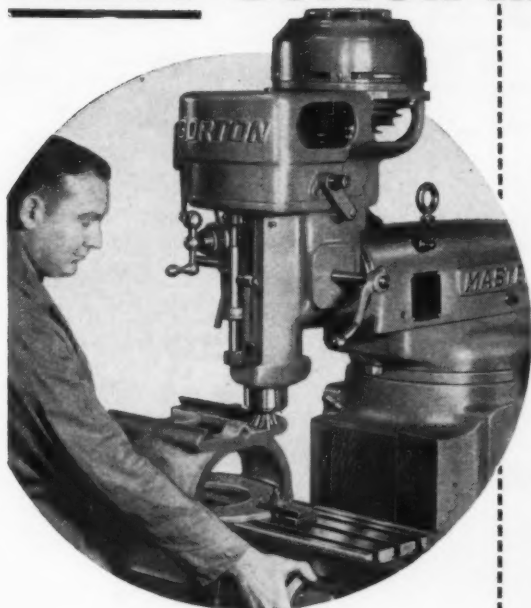
for **UNIVERSAL  
MILLING**  
with  
**SWISS  
PRECISION**  
ask for **SV-12**  
by **SCHAUBLIN**

Unexcelled for a multitude of milling jobs, toolmaker's work to production runs. Accessories\* make this your top-rated all-round milling machine. The compact Swiss design means simple construction, easy operation

- vertical milling head
- vertical slotting head
- dividing headstock
- rectangular table
- inclinable table
- inclinable quill-holder
- swivel type parallel vice
- rotary table
- automatic feed attachment
- centering microscope ...

For complete data  
write to —

# **NEW Gorton Mastermil**



- PRECISION SPINDLE;  
10 SPEEDS, 80-5600 R.P.M.  
STANDARD
- DESIGNED AND BUILT TO  
PROVIDE SUSTAINED  
ACCURACY
- LONGITUDINAL FEED,  
22 INCHES
- SADDLE LENGTH, 24 INCHES
- CROSS FEED, 10 1/2 INCHES
- VERTICAL FEED OF KNEE,  
15 1/4 INCHES
- SPINDLE FEED, 4 INCHES

**For . . .** Milling, boring, duplicating in tool rooms, model shops, pattern shops, production lines, general machine shops, experimental laboratories, machine shops, schools — wherever high-speed vertical milling is done.

**Also available . . .** Infinitely variable spindle feed from 1/4 inch to 8 inches per minute.

Infinitely variable table feed (longitudinal) in 4 ranges: from 1/2 inch to 60 inches per minute.

Ask for special bulletin, No. 2699, on new Gorton Mastermil and for general catalog, 1411-1655, covering the entire Gorton line.



• 2700 LBS.  
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**GEORGE GORTON MACHINE CO.**

1411 RACINE STREET.

RACINE, WIS.

SINCE 1893

Tracer-Controlled Pantographs, Duplicators—standard and special . . . Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

less chatter, better finish. This feature is particularly noticeable on hand operated machines. Less danger of cutter breakage. Helpful in cutting larger size keys. Quality Tool Wks., Inc., Dept. RB, Waukegan, Ill.

Use ACTION Card, opposite page 64. Circle No. 85

### Nose adjustment for feed fingers

A master feed finger for use on the multiple spindle screw machine is ad-



justable at the machine. The nose cap can be easily removed and tension of

## Hardness testing made Easy!

Save Time!  
Test Accurately!

*Ames* PORTABLE  
HARDNESS TESTERS



Frequent hardness testing of metals before and during fabrication and after heat treating is essential today for best results.

Ames Portable Hardness Testers answer the need for a light weight, accurate, dependable tester that may be carried to the work for on-the-job testing. They are easy to use, require no skill, and get speedy, accurate tests wherever the work may be—no delays, no cutting off specimens—no waiting for laboratory tests.

Besides testing flats, rounds, tubing, etc. Ames Hardness Testers make tests that otherwise would be impossible, such as large gears, knives, saws, blades, struts, frames and assembled parts. Thousands are in use paying for themselves over and over again in time and materials saved.

Send for literature or ask for demonstration  
in your plant. No obligation.

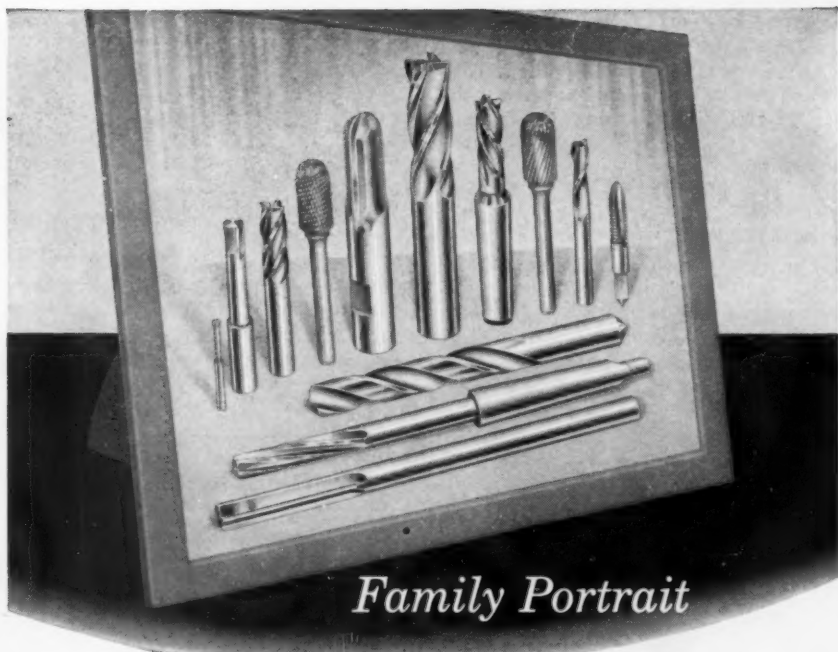


**AMES PRECISION MACHINE WORKS**

Makers of Ames Precision Lathes and Bench Millers

Waltham 54, Massachusetts

Circle No. 372 on Card, Opposite Page 65



## *Family Portrait* of **PRATT & WHITNEY** *Solid Carbide Cutting Tools*

but here's what the camera DIDN'T catch . . .

*all* the types and sizes in our Solid Carbide line . . . that'd take a family album. It doesn't show the years of cutting tool know-how, experience and research that go into every tool (though it's easy to see how this extra quality saves money on your production lines). Out of camera range, too, was P&W Engineering Service that makes sure every P&W Carbide Tool you buy is exactly right for *your* specific jobs. If one picture's worth 1000 words, we believe one sample of P&W Carbide Tools performance is worth 1000 pictures . . . so ask a P&W Cutting Tool Representative to *show* you.



**PRATT & WHITNEY COMPANY**  
INCORPORATED

22 Charter Oak Boulevard, West Hartford, Conn.

Direct Factory Representatives In Principal Cities

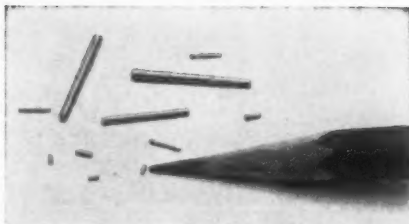
MACHINE TOOLS • GAGES • CUTTING TOOLS

the finger loosened or tightened with a minimum of lost time. Synthetic rubber inserts grip and feed bar stock without scratching or scoring. Green Mfg. Co., Dept. RB, 122 S. Prairie Ave., Rockton, Illinois.

Use ACTION Card, opposite page 64. Circle No. 86

### Miniature pins

Miniature precision pins now being made on a production basis run from as small as .020 diameter by 1/16" long



and are held to a .0002 limit on their diameter. Taper pins are made in the

## FREE CATALOG

*tells how*

**DY-NAMIC  
BALANCING**

**CAN IMPROVE  
YOUR  
PRODUCTION!**

This New "Bear" Catalog shows you how Dy-Namic Balancing can aid your production these two ways:

- 1 Improve finished product performance by eliminating mechanical failures and assuring greater efficiency and longer life. Gives you the quality standards to help meet many government contract specifications.
- 2 Keep your own equipment operating without interruption. Periodic checking and Dy-Namic Balancing of rotating parts in your machinery and production equipment will reduce bearing wear and noise and eliminate costly downtime for repairs.

Write today for your free copy. Bear Manufacturing Co., Dept. M-20, Rock Island, Illinois.

### 24 PAGES OF VALUABLE INFORMATION LIKE THIS:

- How To Balance Parts From 4 Oz. to 8 Tons!
- What is Dy-Namic Un-balance?
- The Difference Between Static and Dy-Namic Un-balance!
- How To Balance Rotating Parts Statically and Dy-Namically In One Operation!
- How Other Plants Are Using Dy-Namic Balancing To Save Time and Money!
- How Dy-Namic Balancing Improves Product Performance!
- How Dy-Namic Balancing Reduces Wear, Eliminates Noise And Vibration.
- Details, Specifications And Engineering Data About Complete Line of "Bear" Industrial Dy-Namic Balancing Machines.



# "BEAR"

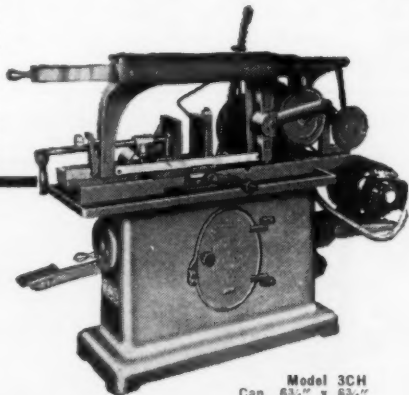
STATIC AND DY-NAMIC BALANCING MACHINES

Circle No. 374 on Card, Opposite Page 65

for cutting  
**BARS,  
ROUNDS  
and PIPE**  
**FASTER**  
with greater  
**ACCURACY**  
and at  
**LESS COST!**

# KELLER

*Power*  
**HACK SAWS**



Model 3CH  
Cap. 6 $\frac{3}{4}$ " x 6 $\frac{3}{4}$ "

**5  
CAPACITIES  
10  
MODELS**

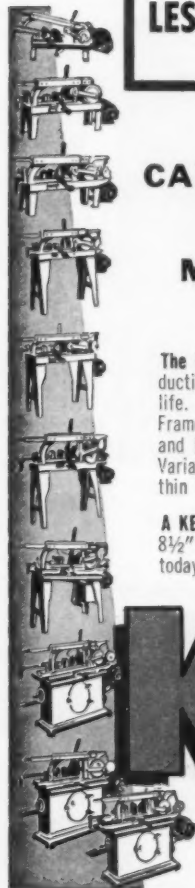
The Popular Model 3CH Wet Cut . . . Built-for-the-job, and delivers top-quality, "production line" cutting. Check these many features for fast, accurate cutting and longer life. Has Quick-acting Swivel Vise, Automatic Stop Switch, Handy Foot-Lift for Saw Frame, Adjustable Bronze Bearings for guide-bar in saw frame, Built-In Coolant Tank and Pump, Automatic Lift on reverse stroke and "Oilite" bearings throughout. The Variable (70-140 lb.) Saw Blade Pressure Control for adjusting cut for cutting from thin wall tubing to heavy bars. Makes blades last longer too!

A KELLER Saw for You . . . 5 Capacities, 10 Models—4" x 4", 5" x 5", 6 $\frac{3}{4}$ " x 6 $\frac{3}{4}$ ", 8 $\frac{1}{2}$ " x 8 $\frac{1}{2}$ " and 10 $\frac{1}{2}$ " x 9". Priced from **\$54.00**. Save money in your plant. Write today, bulletin 655 has the money-saving details.

**SALES SERVICE MACHINE TOOL CO.**  
2357 University Ave. St. Paul W 14, Minn.

# KELLER

*Power* **HACK SAWS**  
Builders of Power Hack Saws since 1931





complete range down to 9/0. Peaslee Metal Products Co., 470 Tolland St., East Hartford, Conn.

Use ACTION Card, opposite page 64, Circle No. 87

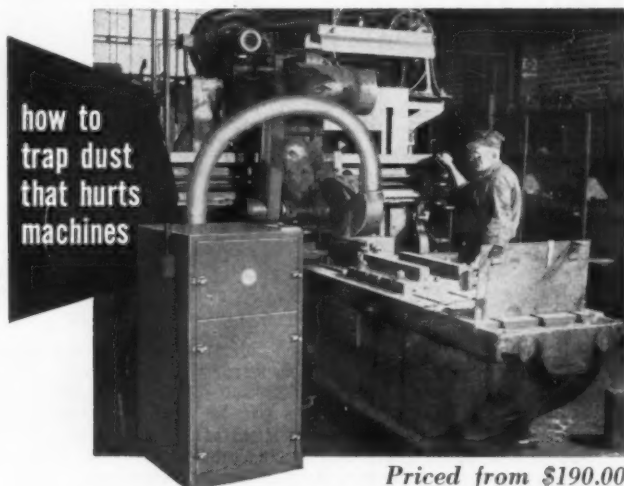
### All-purpose balancer

A heavy duty Bear Dy-Namic balancing machine, No. 3301, handles single and dual motor truck and aircraft wheels, crankshafts, clutches, armatures, flywheels, impellers, and blower wheels. It balances rotating

parts weighing from 25 lb. to 1000 lb. and measuring up to 60" in diameter.

The new model is available with a 2 hp Varidrive unit which delivers spindle speeds of approximately 275 to 1900 rpm, especially for balancing armatures, rotors, pump impellers, flywheels, clutches and similar elements. Bear Mfg. Co., Industrial Div., Dept. HS, Rock Island, Ill.

Use ACTION Card, opposite page 64, Circle No. 88



*Priced from \$190.00*

Moveable TORIT units let you trap dust at its source

Untrapped dust costs you money: "secretly" forces your precision machines out of alignment, slows production, hurts morale. Torit dust collectors solve the problem—fit in almost anywhere. Usually more efficient and money-saving than central (built-into-the-building) systems.

You can move and install Torit units yourself. We'll check the installation—or handle the entire problem if you prefer. Torit units operate only when machines they protect are in use. Filtered air may be returned to room to save heat. Many models and sizes, all self-contained, easy to move. Write today to . . .



**TORIT MANUFACTURING CO.**

Dept. 603, 303 Walnut Street, St. Paul 2, Minn.

Circle No. 376 on Card, Opposite Page 65

**CBS-HYTRON**

**VICKERS®**

America's  
Industrial leaders  
select

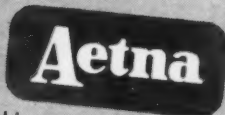
**Cincinnati  
Sub-Zero  
Chilling  
Equipment**

for  
shrinking, testing  
or treatment  
of metals  
and many other  
uses



DIVISION OF BENDIX AVIATION CORP.

**SKF**  
INDUSTRIES, INC.



BALL AND ROLLER BEARINGS



**BELL Aircraft CORPORATION**

Whether you require high production chilling units, laboratory units, high and low temperature test chambers, altitude chambers, or special units, we can satisfy your needs.

Follow the leaders. Write today  
for complete line catalog.



**Cincinnati Sub-Zero Products**

General Offices and Plant

3930 P-6 Reading Road

Cincinnati 29, Ohio

# *Speed Precision Boring*

*and maintain accuracy of .0002" in 12" with the*

## **Kearney & Trecker Model B Autometric Precision Boring Machine**

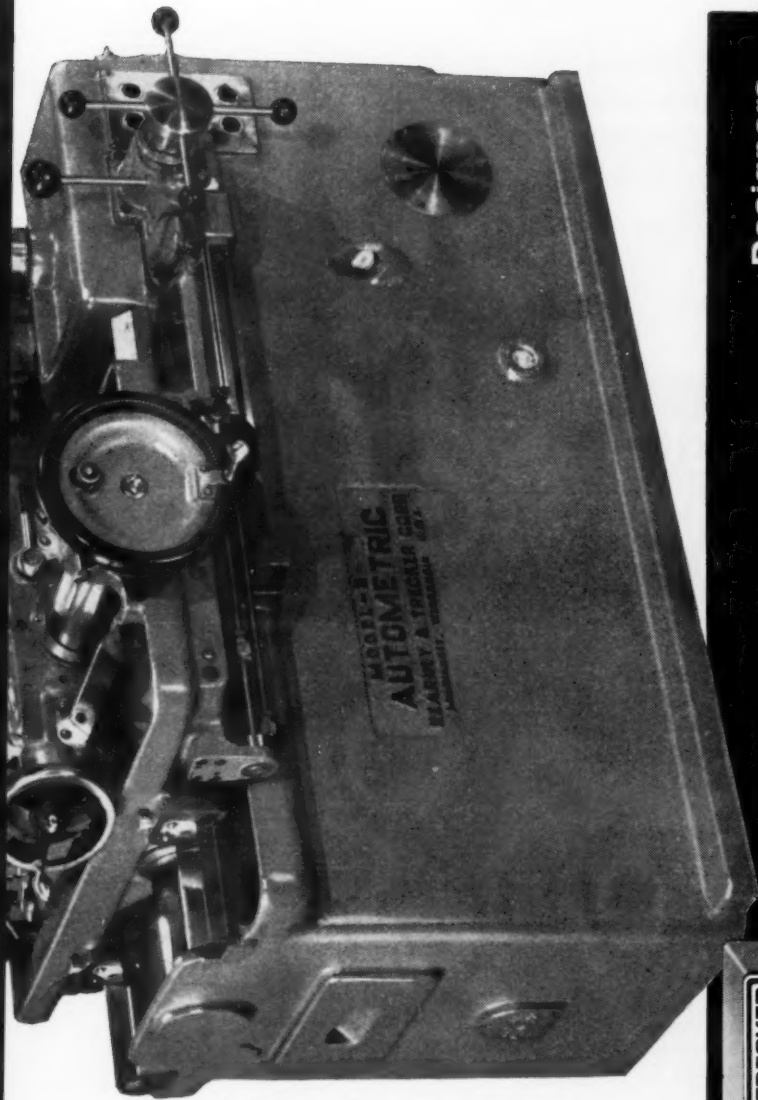
Here it is... unmatched for precision boring of small work... either single pieces or production lots! Work progresses rapidly on the versatile Model B because multiple boring operations can be completed *in just one setup*. These additional features save time, eliminate errors, and make the rugged Model B easy to operate...

- Convenient operating controls • Ease of control
- Ease of setup • Built-in index table and measuring instruments • Wide range of feeds and speeds
- Complete line of especially selected accessories.

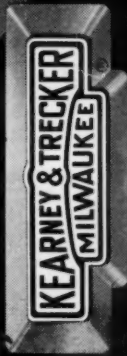


Model B Auto-  
metric; 16" dia.  
table; 10" Vert.  
Travel; 16" Trans-  
verse Travel; 15"  
Carriage Travel;  
8 speed changes—  
.0005" to .0148"  
per Spindle rev.;  
50 to 2500 rpm.

For complete  
details, contact  
your nearest  
Kearney &  
Trecker distribu-  
tor, or write  
Kearney &  
Trecker Corp.,  
6796 W. National  
Ave. Milwaukee  
14, Wis. Ask for  
Catalog No.  
BMA-10.



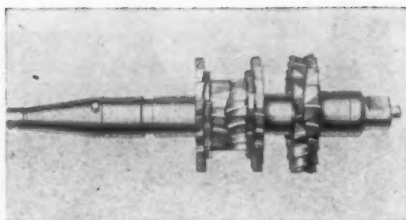
**Designers  
and Builders of Precision and  
Production Machine Tools Since 1898**



## Multiple milling cutters

A line of multiple milling cutters has been announced by the Aber Engineering Works, Waterford, Wisconsin, manufacturers of Aber Curved Tooth Milling Cutters.

The units for production milling combine a wide range of standard Aber cutters for fast accurate cuts on any number of surfaces simultaneously. Side milling, slotting, straddle milling or any



combination of these in one operation can be performed. If the standard



**...COOL  
MACHINE  
TOOL  
OPERATIONS  
THE MODERN  
EFFICIENT  
WAY...WITH**

*Cooling*  
**MIST!**

Mist cooling meets today's need for high-speed machine tool operations. Many high-speed operations, heretofore run dry, may now be efficiently cooled and lubricated. MISTIC MIST Generators provide the practical, economical and most efficient method of producing mist. MIST cools the actual cutting edge of the tool . . . tools last longer and produce finer finishes . . . cuts down-time and reduces tool costs. Easily installed . . . economical to operate . . . requires no special coolant . . . size and volume of spray effectively controlled with no sputtering or intermittent flow.



**WRITE TODAY FOR COMPLETE  
INFORMATION**



**AETNA MFG. Co.**

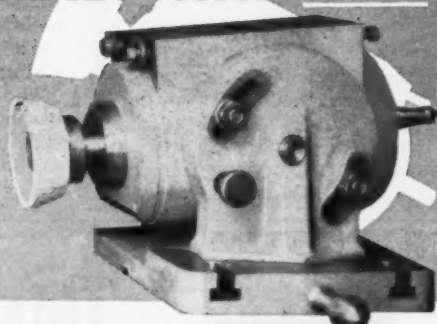
188 SO. YORK ST., BENSENVILLE, ILL.

Circle No. 379 on Card, Opposite Page 63

MACHINE and TOOL BLUE BOOK

# HERE'S A HEAD THAT TILTS

*and Yours Will Nod, Too  
When You See What  
You Can Do With This  
One*



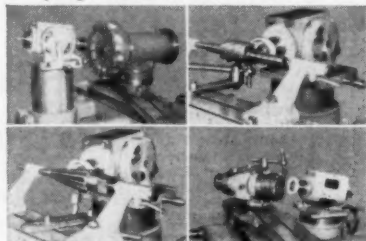
## **POPE** SUPER PRECISION 1 HP, 3600 RPM MOTORIZED TOOL AND CUTTER GRINDER CLEARANCE ANGLE SWIVELLING HEAD

*With Angular Adjustment In A Vertical Plane*

**Give this versatile head the nod and save time and money these seven ways:**

1. You can use cup wheels for practically all clearance angles and thus produce a cutting edge on tools that lasts longer because it is stronger.
2. You can keep the tooth rest on the center line of the cutter for practically all grinding on centers or in the work head.
3. You can grind most cutters and reamers all over with a single set-up using the swivelling table and Pope tilting head.
4. You can read all clearance angles directly in degrees from the scale provided on the head. No more mistakes.
5. You can get the right clearance angle on such tough grinding jobs as slab mills, taper reamers, angular cutters and form tools.

6. You have one safe speed — 3600 RPM — for all wheels generally used on cutter grinders. Heat checking of cutters is virtually eliminated.
7. You have a head that's so easy to adjust and use it saves you time and money every time you grind a tool.



**Ask us to submit complete specifications including price and delivery.**

No. 101

*Specify*

# **POPE**

PRECISION SPINDLES

**POPE MACHINERY CORPORATION**

Established 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS



cutters do not meet specific requirements, the company designs and manufactures units to suit these unusual applications.

Incorporated on all cutters is the curved tooth principle which provides a perfect shearing action. The corner of the tooth is built up and strengthened so that shock of contact with the work is eliminated.

Use ACTION Card, opposite page 64, Circle No. 89

## Simple solenoid valve-in-head cylinder

The solenoid of the Model SVS valve-in-head cylinder is designed for 110 volts, 60 cycles continuous operation and its operation controls the movement of the cylinder rod when air is brought to the single port on the unit. The standard actuation being that each time the solenoid is energized, the piston rod of the cylinder goes forward and stays for-

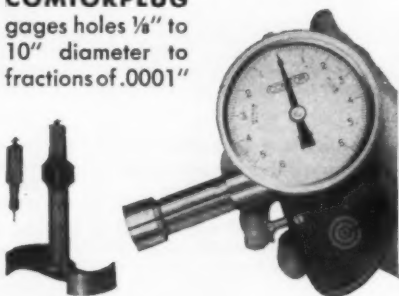
### THE GAGE USED BY:

#### USERS INCLUDE:

Aircsearch Mfg. Co.  
Allison Div.  
Apex Electrical Mfg.  
Buick Motor Div.  
Century Electric Co.  
Chicago Pneu. Tool  
Chrysler Corp.  
Continental Motors  
Curtiss-Wright  
Detroit Transmission  
Douglas Aircraft  
Fairchild Engine &  
Airplane Co.  
Falk Corp.  
Ford Motor Co.  
General Electric Co.  
Hamilton Standard  
Division  
Harris Seybold Co.  
Homelite Corp.  
Int. Harvester Co.  
Jacobs Mfg. Co.  
Lycoming-Spencer Div.  
McDonnell Aircraft  
Northrop Aircraft  
Otis Elevator  
Pontiac Motor Div.  
Scintilla Magneto  
Steel Products Eng.  
Studebaker-Packard  
United Airlines  
Warner Gear Div.

# This is it

**COMTORPLUG**  
gages holes  $\frac{1}{8}$ " to  
10" diameter to  
fractions of .0001"



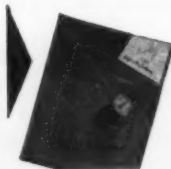
*Maybe you, too, have  
a volume gaging problem  
it could solve.*

**Send for Bulletin and see**

**ASK FOR BULLETIN 49**

**COMTOR COMPANY**

62 Farwell St., Waltham 54, Mass.





ward as long as the solenoid is energized. Breaking the electrical contact returns the rod to its original position.

The cylinder will operate on air pressures of 5 to 150 psi and the valve will cycle at 800 strokes per minute. The solenoid part of the valve is silent in operation and no air bleeds to atmosphere after the spool in the valve has shifted to either one of its two positions. The A. K. Allen Co., 57 Meserole Ave., Dept. DR, Brooklyn 22, N.Y.

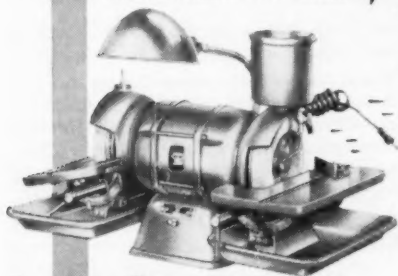
Use ACTION Card, opposite page 64. Circle No. 90



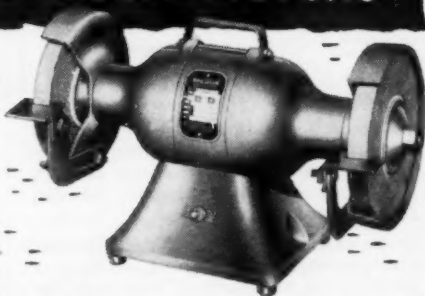
**LAST YEARS LONGER!**

# **Baldor GRINDERS** *with TOTALLY ENCLOSED MOTORS*

**600 Series Grinder.** ½ HP, 1 phase, 60 cycle, 3450 RPM, 6" wheels, \$57.00  
Pedestals available for all models



**Carbide Tool Grinder.** Sharpens quickly, accurately. Reversible ½ HP motor withstands repeated overloads. 1½" wide wheels. \$169.70.



Specially engineered for extra heavy-duty, precision grinding! You can't get more regardless of price!

- Totally enclosed, splash-proof motors keep out dust, dirt, grit, metal particles. Can't clog... can't cause trouble!
- Lifetime lubricated ball-bearing motors never require servicing! Dynamic balancing assures smooth operation without vibration.
- Complete line—¼ HP to 3 HP, 6" to 12" individually balanced wheels. Bench and pedestal types.
- Fully guaranteed by Baldor—famous for fine grinders for more than 35 years!

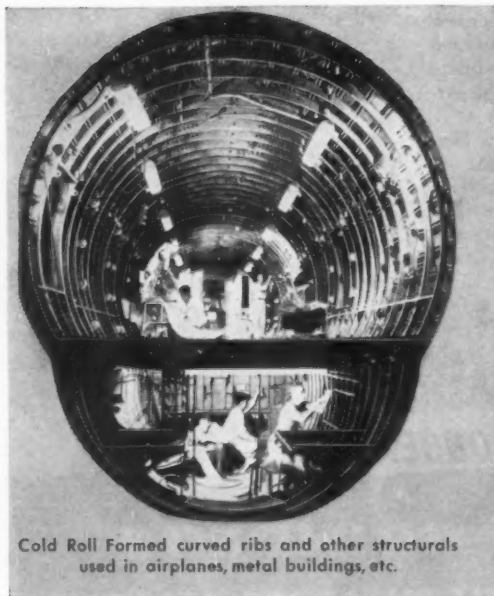
**It pays to use dependable Baldor Grinders!**

**BALDOR ELECTRIC CO.**

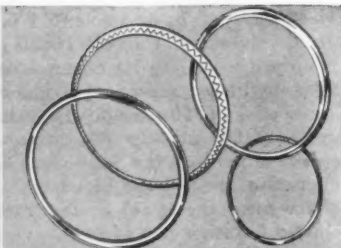
4364 Duncan Ave. • St. Louis 10, Mo.

Write for Bulletin 321-M.

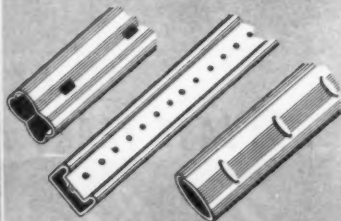
Circle No. 382 on Card, Opposite Page 65



Cold Roll Formed curved ribs and other structurals used in airplanes, metal buildings, etc.



Rings of any size, for a multitude of different uses.



Roll-formed shapes, notched, perforated, indented or embossed.

## 1001 Things Now Being Done by COLD ROLL FORMING

The basic function of a Yoder cold roll forming machine is, of course, to convert flat rolled strip or sheets at high speed into mouldings, panels, tubular, channel and other shapes.

Quite often, these shapes need further elaboration before being ready for assembly or installation. They may, for instance, have to be curved, coiled, or made into rings. Or they may need to be perforated at certain intervals of spacing, notched, embossed, or otherwise finished by additional operations. You may want to combine two or more

materials into a finished shape, such as carbon steel with stainless, felt, wood, etc.

These and many other things can be done with Yoder machines at little or no extra cost over and above normal conversion costs, simply by providing special attachments, or by auxiliary units installed in line with the forming mill.

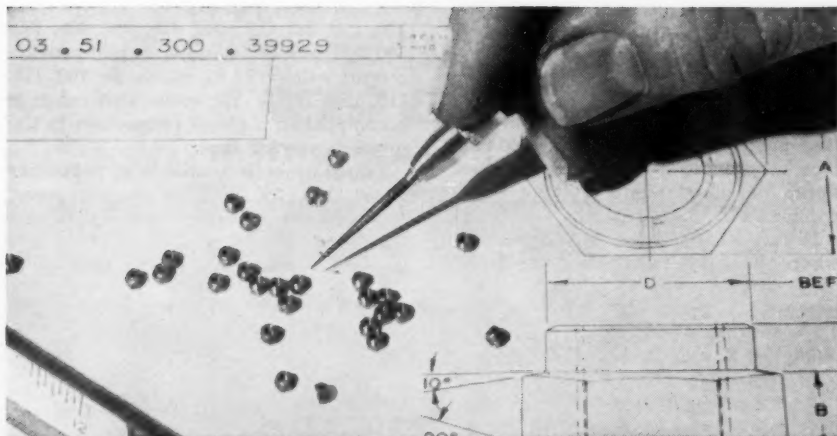
Send for a copy of The Yoder Book on Cold Roll Forming.

### THE YODER COMPANY

5509 Walworth Ave., Cleveland 2, Ohio



COLD ROLL FORMING MACHINES  
ROTARY SLITTING LINES  
PIPE AND TUBE MILLS—Electric Weld



**FLEXLOC MICROSIZE** locknuts meet designers' needs for tiny precision nuts that retain strength and holding power in the smallest assemblies—servomechanisms, electronic and electrical equipment, all miniature devices.

## New FLEXLOC Microsize Locknuts

Now available in Alloy Steel, Stainless Steel, Brass  
and Aluminum for lighter, more compact designs



New FLEXLOC Microsize locknuts are smaller and lighter than regular FLEXLOCs of the same nominal diameter. Wrenches of smaller size are used to install them. Mating joints or flanges can be designed smaller—with no loss in strength or convenience of assembly.

Microsize FLEXLOCs have all the advantages of larger FLEXLOCs. One-piece, all-metal construction—nothing to put together, come apart, lose or forget. Use them as lock or stop nuts—they stay put anywhere on a threaded member as soon as the locking threads are fully engaged. Uniform locking torques insure accurate preloading. There are no non-metallic inserts to pop out or deteriorate. Moisture, dryness, oil won't affect these Microsize FLEXLOCs. Just screw them on. They lock and stay locked. Vibration won't shake them loose.

For complete information on Microsize FLEXLOCs, consult your authorized SPS distributor. Or write STANDARD PRESSED STEEL CO., Jenkintown 52, Pa.

SIZE	Across Flats		Shoulder Height		Across Corners	Height
	MAX.	MIN.	MAX.	MIN.	MIN.	+ .000 - .003
0-80 NF-3B	.111	.107	.047	.042	.123	.075
1-64 NC-3B	.127	.123	.0635	.0585	.141	.090
1-72 NF-3B	.127	.123	.0635	.0585	.141	.090
2-56 NC-3B	.158	.153	.068	.063	.176	.105
2-64 NF-3B	.158	.153	.068	.063	.176	.105
3-48 NC-3B	.190	.183	.071	.066	.210	.120
3-56 NF-3B	.190	.183	.071	.066	.210	.120
4-40 NC-3B	.190	.183	.072	.067	.210	.120
4-48 NF-3B	.190	.183	.072	.067	.210	.120

**SPECIFICATIONS:** Available in brass (plain or cadmium plated) and aluminum (plain or chemically treated), for temperatures to 250°F; alloy steel, 18-8 stainless, for temperatures to 550°F.

**FLEXLOC® LOCKNUT DIVISION**

STANDARD PRESSED STEEL CO.

**SPS**  
JENKINTOWN PENNSYLVANIA

## Control transformer for off-standard voltage applications

The Acme control transformer has five primary taps and four secondary taps to provide a selection of connections for off-standard voltage supply applications.

It can be used on any application where primary voltage supply is 208,

220, 230, 240; 380, 400, 416; 440, 460, 480; 500, 550, 575, or 600 volts. It will provide output voltage of 85, 91, 95, 99; 100, 110, 115, 120; 125 or 130 volts. This range is accomplished through connection to the proper external taps.

Transformer is available in capacities of 50, 150, 250 and 500 volt-amperes. Acme Electric Corp., Dept. RH, Cuba, N.Y.

Use ACTION Card, opposite page 64. Circle No. 91

# SYNTRON

Vibrating

## LAPPING POLISHING MACHINES



**Before**      **After**



- Automatic, high-speed lapping and polishing of parts, samples, etc.
- Produce perfect metallographic finishes in one-third the time.
- Eliminate use of expensive polishing wheels—practically no rejects.

New Syntron Lapping-Polishing Machines are completely automatic. Driven by variable controlled electromagnets, they assure a positive, even polishing action on practically any part or sample where microscopic finishes are required. No expensive installation or grinding equipment required.

**Of proven dependable Quality**

**Write for FREE  
Catalogue Data**

**SYNTRON COMPANY**

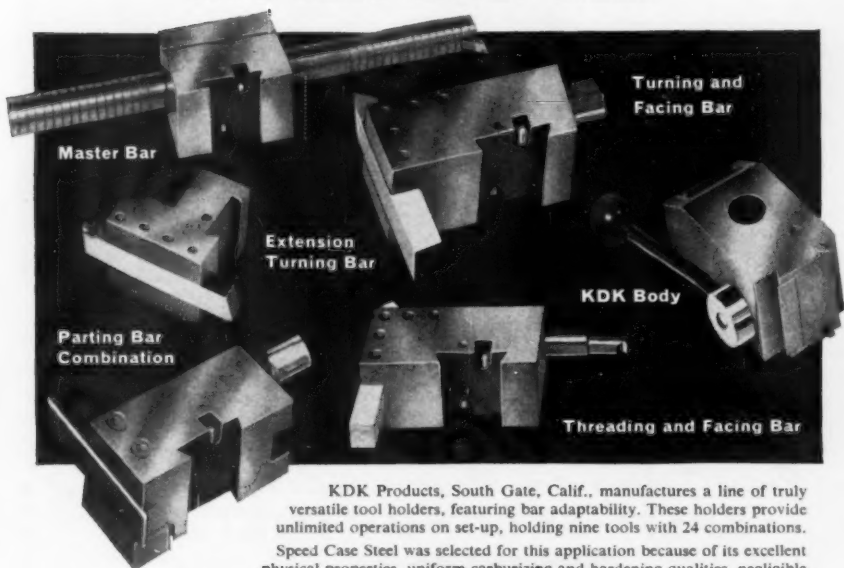
300 Lexington Ave.

Homer City, Pa.

Tool holder manufacturer specifies

**SPEED CASE**

... a time saver steel



KDK Products, South Gate, Calif., manufactures a line of truly versatile tool holders, featuring bar adaptability. These holders provide unlimited operations on set-up, holding nine tools with 24 combinations.

Speed Case Steel was selected for this application because of its excellent physical properties, uniform carburizing and hardening qualities, negligible distortion and superior machinability. The bodies are flame cut from plates and hardened to 50-60 Rockwell C., while the bars are hardened to 40-50 Rockwell C., and master bars for boring to Rockwell 35 C.

Users of KDK Tool Holders in almost every state are achieving new production records—a tribute to KDK and Speed Case ... a time saver steel.

THE SPEED STEELS ARE DISTRIBUTED COAST TO COAST BY THESE WAREHOUSES

Beals McCarthy & Rogers, Inc.  
Buffalo, N. Y.

Bridgeport Steel Co.  
Milford, Conn.

Brown-Wales Co.  
Cambridge, Mass.

Burger Iron Co.  
Akron • Dayton, Ohio

Grammer, Dempsey & Hudson, Inc.  
Newark, N. J.

Earle M. Jorgensen Co.  
Los Angeles • San Francisco  
Oakland • Houston • Dallas • Tulsa

Peninsular Steel Co.  
Detroit, Mich.

Pidgeon-Thomas Iron Co.  
Memphis, Tenn.

Horace T. Potts Co.  
Philadelphia • Baltimore

Jones & Laughlin Steel Warehouse Division  
Chicago • Cincinnati • Louisville • New York

W. J. Holliday & Co. Warehouse  
Indianapolis, Indiana



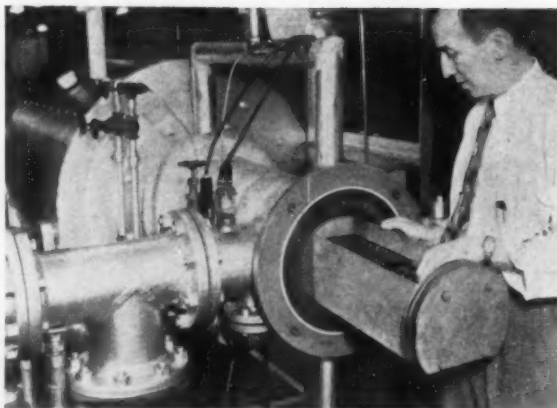
**SPEED STEELS**

JONES & LAUGHLIN STEEL WAREHOUSE DIVISION  
INDIANAPOLIS 7, INDIANA

## Heat Treating Small Parts

A new process permits heat treating stainless parts to any desired degree of hardness or toughness without causing discoloration of their fine finish or any dimensional distortion.

The process is achieved by precise control of the heat treating furnace atmosphere through special preparation of the atmosphere gases. Also, the furnaces are especially designed for gas tightness to prevent entrance of any contaminants to the furnace atmosphere. Where required, the process is carried out in several stages, including a main heat treating step first and even a heat treating step in vacuum later. It can also be arranged to produce controlled



amounts of growth or shrinkage in dimensions of the parts. Allied Products Div., Hamilton Watch Co., Lancaster, Pa.

Use ACTION Card, opposite page 64, Circle No. 92

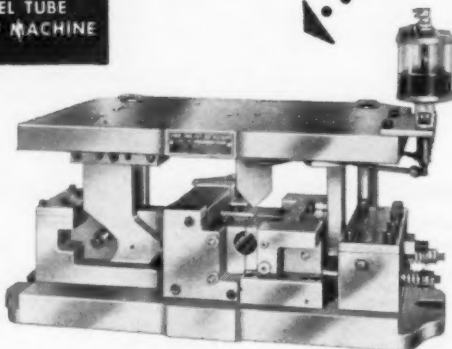
## *Cuts Tubing to Accurate Lengths in* **-SPLIT-SECOND TIME!**

**LENGTHS** of  $\frac{1}{2}$  inch or more are accurately cut to  $\pm .010''$  with each stroke of press—actually less than  $\frac{1}{3}$  of a second or faster than any other known method. In addition to being rapid and precise, the Vogel Cut-Off also cuts clean with a minimum of burr and distortion. Many thousands of cuts can be made before shear blades require sharpening.

Unit No. 12 accommodates tubing up to  $\frac{1}{2}''$  O.D. with  $\frac{3}{32}''$  wall; the No. 2 takes tubing up to 2" O.D. with  $\frac{1}{8}''$  wall.

Ask for sample showing how clean-cut your tubing can be sheared with this machine.

**VOGEL TUBE  
CUT-OFF MACHINE**



PATENTED

**VOGEL**

**TOOL AND DIE CORPORATION**  
1825 NORTH 32nd AVENUE, MELROSE PARK, ILLINOIS



The Drill Sarge says . . .



**"New York Twist Drills  
K.O. more rivets!"**

**NEW YORK'S "KNOCKOUT" DRILLS EXTRA TOUGH FOR  
ONE OF AIRCRAFT INDUSTRY'S TOUGHEST ASSIGNMENTS**

Aircraft modification requires removal of thousands of rivets and these Knockout Drills remove more of them per minute — another new development by the engineers of New York Twist Drill Company. They're made for aluminum as well as titanium and stainless steel, and aircraft plants report an improvement of almost two to one over drills formerly recommended for the job. So do trailer companies with similar operations.

Extra smooth flutes and accurate points on New York drills improve drilling performance in all tough metals and plastics. And you save 20% on your twist drill bill! New York drills last longer and you get more holes, all perfectly round and exactly on size without burrs on the break through. Split points at no extra charge, aid in biting in.

THESE NEW YORK DRILLS ALWAYS IN FINISHED STOCK: All popular aircraft sizes, in standard lengths and aircraft extension, 6" and 12"

Write now for catalog, technical manual and net prices

**NEW YORK TWIST DRILL COMPANY, INC.**



EASTERN HEADQUARTERS: 278 LAFAYETTE STREET, NEW YORK 12, N. Y.  
MIDWEST HEADQUARTERS: 30-A NORTH CLINTON STREET, CHICAGO 6, ILL.





**FOR *High Speed* CUTTING  
TO AMAZING TOLERANCES**

**... The TY-SA-MAN 122-C**



**IF YOU CUT ...**

ALUMINUM  
MAGNESIUM  
TITANIUM  
STEEL  
IRON  
COPPER  
GRATING  
PLATE  
STRUCTURALS  
STAINLESS STEEL

**There's a Ty-Sa-Man Saw  
to Meet Your Needs**

**Ty-Sa-Man**

**Cut Your Inventory By  
Cutting Your Own Metal**

Stock big sizes and cut it as you need it ... that's the success story behind the Ty-Sa-Man saws that are paying big dividends to warehouses, fabricators and manufacturers from coast to coast. Best of all, when you cut it, in most cases, it's ready to use. The clean, square, accurate edges produced by this production saw need little or no machining or finishing work. This adds up to a saving of thousands of man hours, and just as important, saves the loss of waste metal.

**Write For Free Catalog  
MACHINE COMPANY**

800 WHITE AVENUE, KNOXVILLE, TENNESSEE

Circle No. 388 on Card, Opposite Page 65

# AMES



## Check Motions or Dimensions In .001" up to 10" Range.

With Ames Long Range Dial Indicator models you can measure in .001", long slide travel, large cams, deep recesses or other dimensions requiring indicator spindle travel of up to 10". Also they have all the advantages built into Ames regular indicators:—large diameter dials, widely spaced dial graduations; movable dials; replaceable contacts, count hands to indicate revolutions of the indicator hand.

Send your problem in long range measuring, Ames will be glad to suggest a solution.

*Representatives in principal cities*



## B.C. AMES CO.

28 Ames Street, Waltham 54, Mass.

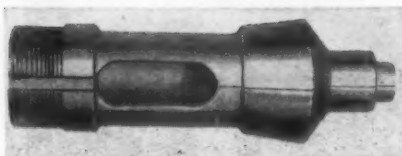
MANUFACTURER OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

Circle No. 389 on Card, Opposite Page 65

## Machinable expanding mandrels

The Erickson expanding collet can grip in a hole as small as  $\frac{1}{8}$  inch. It is a one-piece mandrel which acts as a reversed collet; it grips the workpiece on the inside surface, converts machine to internal chucking.

This expanding-collet is machined to size on the customer's equipment for greatest possible accuracy. Multiple



mandrel sizes can be obtained from one basic size of expanding-collet. Erickson Tool Co., East 23rd and Hamilton Ave., Cleveland 14, Ohio.

Use ACTION Card, opposite page 64, Circle No. 93

suspension type

## FLEXIBLE SHAFT MACHINE

eliminates tooling problem for I.B.M.



International Business Machines Corporation had the problem of reaming holes .813" in diameter in the mounting hanger on the main base of their 407 Accounting Machine. To eliminate expensive tooling for this operation, they selected a STOW V50 portable flexible shaft machine, which was specially fitted with an on-off switch mounted on the handpiece.

The V50 machine delivers 1150, 2100, 3450, or 5750 RPM, is furnished with a 6 foot flexible shaft. Other speeds can be achieved by using different size pulleys. (I.B.M. ran the reamer at 750 RPM.) Available in either  $\frac{3}{4}$ , 1,  $1\frac{1}{2}$  or 3 HP, the

V50 can be used for grinding, buffing, sanding, wire brushing and drilling.

**STOW MANUFACTURING CO.**

30 Shear Street

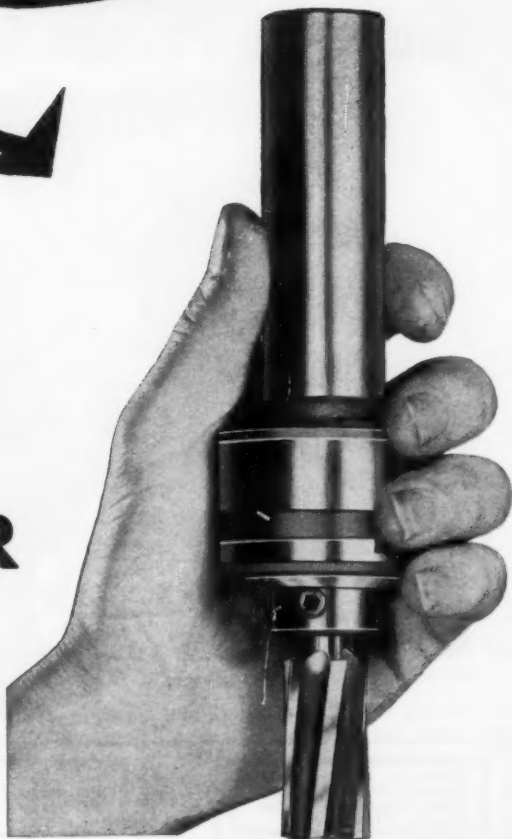
Binghamton, New York

Circle No. 390 on Card, Opposite Page 65

**IT'S TRUE!**

**Glenco**  
*Floating*  
**TOOL  
HOLDER**

*No Wiggle-  
No Wobble-  
No Bell-Mouth  
HOLES!*



***Automatically Compensates for Misalignment!***

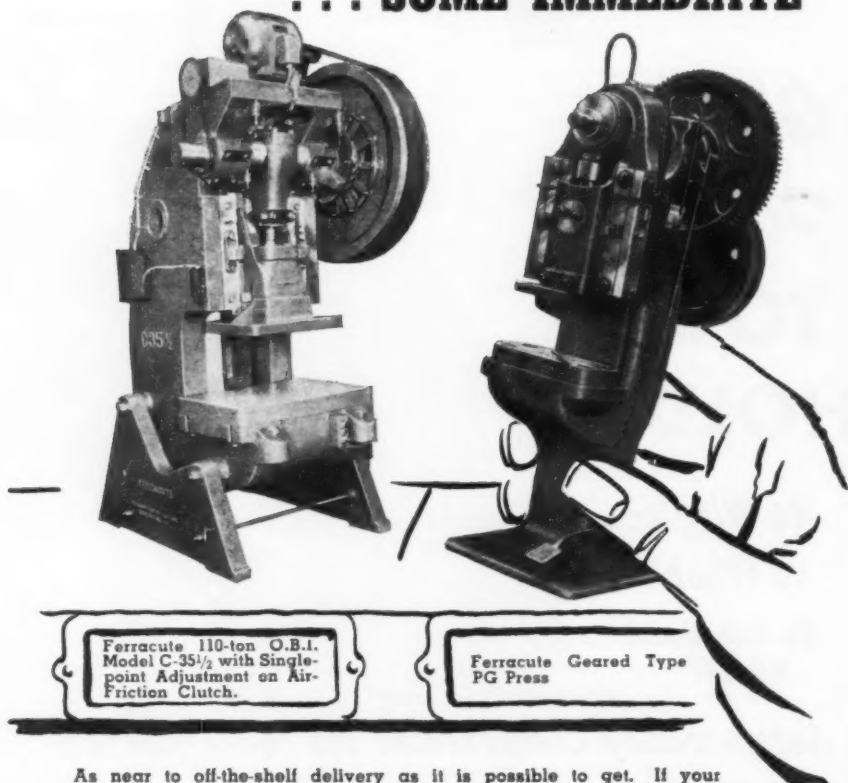
You be the judge. Try any Glenco 30 days under your shop conditions. Return it if you wish.

***Write for Folder J.***

**THE J. C. GLENZER CO. Inc.**

1546 E. NINE MILE ROAD, DETROIT 20, MICH.

# Punching Presses up to 110 tons Ready for Prompt Shipment ... SOME IMMEDIATE



Ferracut 110-ton O.B.I.  
Model C-35½ with Single-  
point Adjustment on Air-  
Friction Clutch.

Ferracut Geared Type  
PG Press

As near to off-the-shelf delivery as it is possible to get. If your plans call for really *fast* installation of Punching Presses, Ferracut

is your source. A complete line of Ferracut Punching Presses 20 to 200 ton capacity.

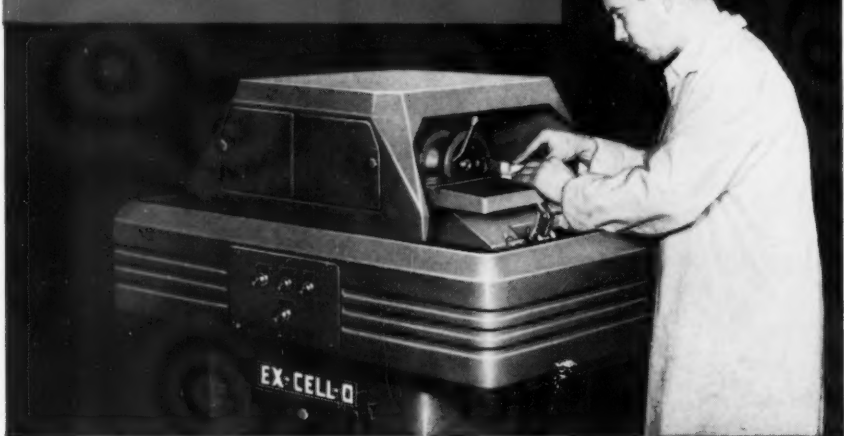
**FERRACUTE**

Since 1863

**FERRACUTE MACHINE CO.**

Manufacturers of Power Presses and Special Machinery  
BRIDGETON, NEW JERSEY, U.S.A.

Style 44-A Ex-Cell-O Carbide Tool Grinder for tools requiring a fine cutting edge. Uses conventional or diamond wheels.



## FAST WORK ON A WIDE RANGE OF TOOL SIZES

There's much you'll like about Ex-Cell-O Tool Grinders.

You'll like the power and smoothness made possible by the balanced inbuilt motor spindle that rotates in Ex-Cell-O Precision Bearings.

Ex-Cell-O Tool Grinders, such as Style 44-A pictured above, grind single point tools of carbide, cast alloys and high speed steels to long-lasting, sharp edges. Grooved, hardened steel plates in the tables resist wear and provide a good bearing surface for the tools. All Ex-Cell-O Grinders are double-end models; all use steel back wheels and

have large, easy-to-adjust tool rest tables and coolant equipment.

Ex-Cell-O has a tool grinder to fit all types of operations. Why not write Ex-Cell-O or call your local Ex-Cell-O Representative?

**EX-CELL-O**  
CORPORATION  
DETROIT 32, MICHIGAN 

**EX-CELL-O FOR PRECISION**

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD FINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

56-53

November, 1956

Circle No. 3A on Card, Opposite Page 65

256-A

from Johnson's Wax



## The only major improvement in coolants in 50 years

Johnson's metalworking fluids came in with automation. They are as efficient and advanced as 1956 high-speed machine tools. They bring you the first major improvement in coolants since 1900—the use of wax and wax-type synthetics.

Johnson's discovery has uncovered tremendous new profit possibilities for hundreds of progressive shops. To get in-

creased production from men and machines, use Johnson's complete line of metalworking fluids for machining, grinding, forming.

Contact your local Johnson's industrial distributor. He will gladly set up an in-your-shop test. Be sure to ask about Johnson's money-back *Guarantee of Superior Performance* over ordinary coolants.

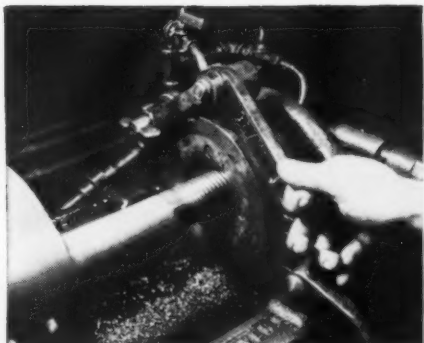
**S. C. Johnson & Son, Inc.**

Industrial Products Dept., Racine, Wisconsin

*Pictured below is Johnson's J-Cool, one of a complete line of modern coolants for today's high-speed production.*







**Need extra-strong, free-machining alloy steel?**

## **Call us for FC ALLOY STEEL**

Like most mining concerns, Putman and Greene, Inc., Philipsburg, Pa., uses a good bit of steel to repair and maintain their fleet of off-the-road haulers and earth-moving equipment. Listen to what Mr. Russel Lucas, Shop Superintendent for the company, says about FC Alloy Steel: "FC machines so well and has such superior strength that we use it exclusively for the turning of pins, bolts, shafts and axles."

*Here are some facts about FC Alloy Steel:*

It gives about 3 times the tool life of comparable machining steels.

It is delivered heat-treated to 255 to 302 Brinell hardness.

It has from 125,000 to 140,000 psi tensile strength.

U. S. Steel Supply can sell you FC Alloy Steel Bars in any size or length you need. You get fast delivery, too. Call us today.

# **U. S. STEEL SUPPLY DIVISION**

*General Offices*

208 So. La Salle St., Chicago 4, Ill.

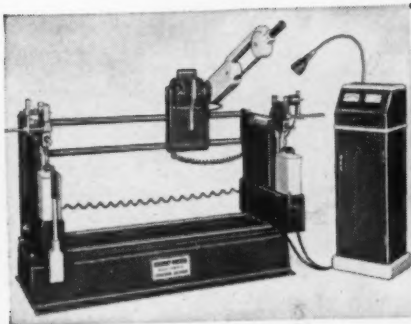


**Warehouses and Sales Offices  
Coast to Coast**

**UNITED STATES STEEL**

Circle No. 3D on Card, Opposite Page 65

# ***NOW!*** *The most versatile, precision* **DYNAMIC BALANCERS** *...At Lowest Cost!*

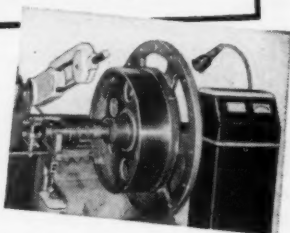


## **THE NEW STEWART-WARNER ELECTRONIC INDUSTRIAL BALANCERS**

- 3 models for use in single-piece, short-run or long-run production quantities.
- Set-up time less than 2 minutes!
- For balancing a wide range of work on same machine—with no special tooling, coupling devices or accessories needed to change jobs!

**Only the Stewart-Warner Balancers  
Offer These Maximum and Minimum Ranges:**

	Weight Range	Diametral Range	Length Range	Sensitivity
Model 704	½ lb. to 1000	½" to 44"	4½" to 55"	0.01 inch-oz.
Model 708	1 lb. to 5000	1" to 68"	7" to 83"	0.04 inch-oz.
Portable	In-place balancing of all rotating machinery.			



The new Stewart-Warner Industrial Balancers not only give you lowest first cost, but cut the cost of balancing *per piece* so low that even smallest shops can now afford their own precision balancing equip-

ment! Handle single-piece, short-run and long-run production, as well as maintenance of your own machines. Semi-skilled workers can learn to operate them in one day! Extremely versatile, sturdy, accurate.

## **Stewart-Warner Corporation** *the first name in light-duty electronic balancers*



Write for  
**FREE**  
illustrated  
brochure on  
industrial balancing



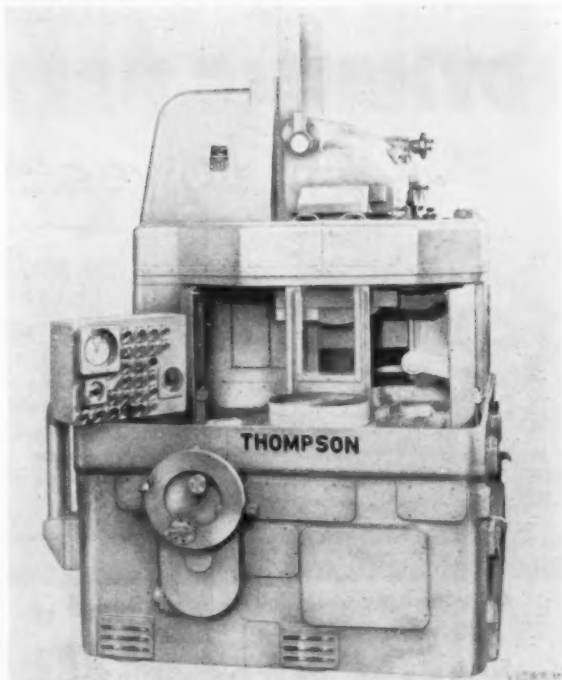
Stewart-Warner Corporation, Dept. A-116  
1834 Diversey Parkway, Chicago 14, Illinois  
Please send me all the facts about Stewart-Warner  
Industrial Balancers.

Name .....  
Company .....  
Address .....  
City ..... Zone ..... State .....

## Twin Rotary Production Grinder

The Thompson Type TR twin rotary grinder reduces cycle time because the operator loads one magnetic chuck at front position while another part is being ground automatically in rear position. Typical job applications include automotive gear clusters, aircraft turbo-jet blades, automotive transmission gear faces, circular metal saws and other intricate parts.

Features include: Horizontal wheelhead grinding with 14" or 20" diameter wheel to controlled size with automatic compensation of the feed screw; free loading time enabling operator to arrange other parts or operate other machines; in-position wheel truing to dress wheel automatically, preset and to machine cycle; assured accuracy of finish with automatic wheel truing and spark out. The Thompson



son Grinder Co., 1534 W. Main St., Springfield, O.

Use ACTION Card, opposite page 64. Circle No. 94

## Automatic Gage Checks 20 Dimensions

A fully automatic, four-station, in-process sorting gage, Model 144 B-34,

that measures 20 dimensions on 13 different sizes of jet engine stator blades,

OPEN

CLOSED

TRADE

**AUTOM**

MARK

CLOSED

OPEN

**Plain Type**

**CONTINUOUS HINGES**

**Offset Type**

All hinges shown can be furnished with special holes, cutouts and bends to suit the job.

THREE-FOURTHS OFFSET

**AUTO MOULDING & MFG. CO.**

**1110 E. 87TH ST.**

**CHICAGO 19, ILL.**

**SPECIFICATIONS**

Open width  $\frac{7}{16}$ " to 6"

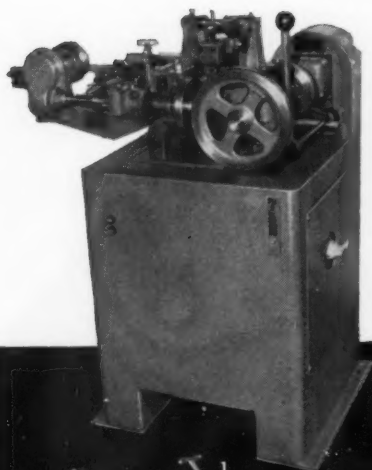
Gage Material .040 to .125

Pin Diameter .101 to  $\frac{3}{16}$

Lengths to 120"

SEMI-OFFSET

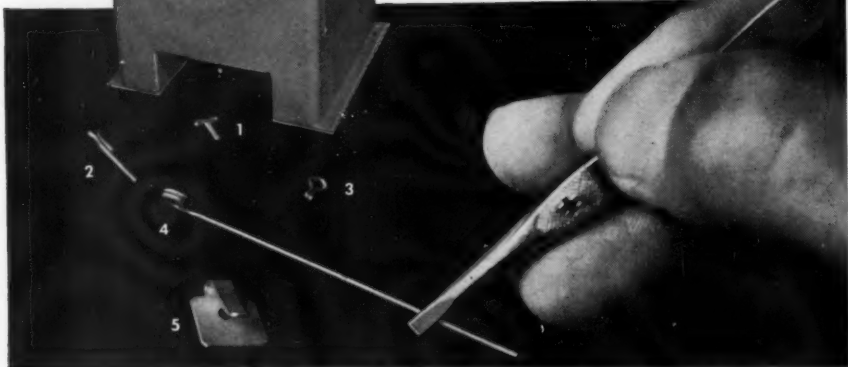
Circle No. 394 on Card, Opposite Page 65



# TINY...

## AND TOUGH TO PRODUCE

Intricate Forming is  
Automatic on a  
Nilson 4-Slide



Small wire and ribbon metal forms shown here in actual size are typical examples of modern precision production on a Nilson #00 4-Slide. Compact in size, this 4-Slide produces up to 375 pieces per minute in material not exceeding .040 dia. and 3" in blank length. Easily access to tooling, accurate feeding to within .003, and rugged construction assures years of precision forming.

**1 Mercury Switch Part . . . .014" x .019"** platinum wire, formed with tolerances within .001" on over-all length. Production rate, 175 per minute.

**2 Electrical Contact . . . .0076" x .0030"** wide phosphor bronze formed at a production rate of 200 per minute.

**3 Swivel Part . . . .025" brass wire.** Heading operating includes eye formed with tolerances within .008", shank within .003 tolerance. Production rate, 300 per minute.

**4 Leadwire . . . .026" soft tinned copper wire** formed at a rate of 140 per minute with two 7/64" diameter windings.

**5 Contact Part . . . .010" x 3/4" wide phosphor bronze** formed at 175 per minute.

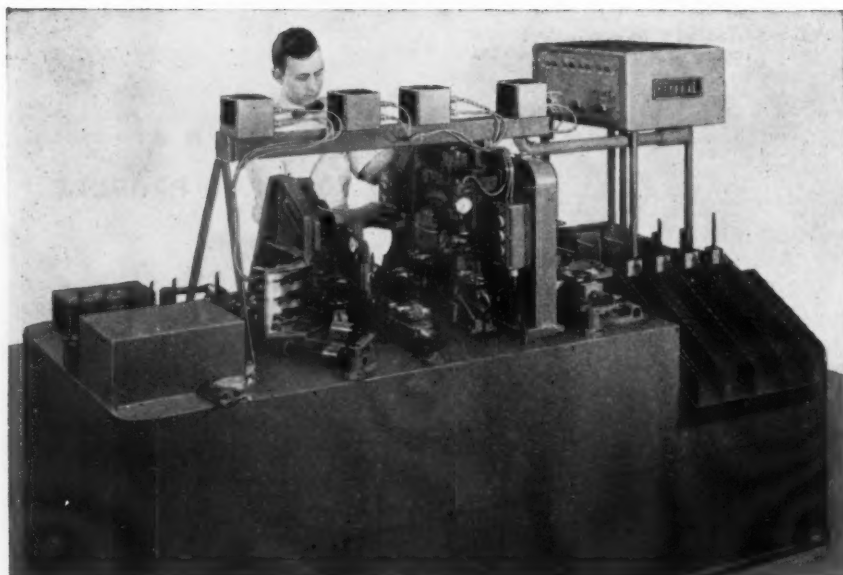
**A.H.**  
**NILSON**  
**MACHINE COMPANY**

**1511 RAILROAD AVENUE, BRIDGEPORT 5, CONN.**



Automatic Chair Making Machines • Staple Forming Machines • Wire and Stock Reels • Wire Straightening Equipment • Slide Feeds for Presses • Wire and Ribbon Stock Forming Machines

Circle No. 395 on Card, Opposite Page 65



**NEW NESTING TYPE  
TOTE PANS**

Sturdy 16 ga. metal.  
20" long x 12" wide  
x 6 1/4" deep. Drag  
holes and handles at  
both ends.

**J. L. LUCAS & SON, INC.**  
Bridgeport 5, Conn.

Circle No. 396 on Card, Opposite Page 65

**DRILL THESE HOLES**  
BY A QUICK, EASY INEXPENSIVE METHOD  
Your business letterhead will bring literature  
**WATTS BROS. TOOL WORKS**  
Wilmerding, Pa.

Circle No. 397 on Card, Opposite Page 65

2" to 6" long, operates at a speed of 0-40 workpieces per minute. It directs reject parts out of the manufacturing line and allows only good parts to pass on to a conveyor to be carried to further processing.

The gage is conveyor fed and mounted in the continuous line. A walking beam moves work through. All measuring is done with the work at rest and the gaging units in forward position. Re-

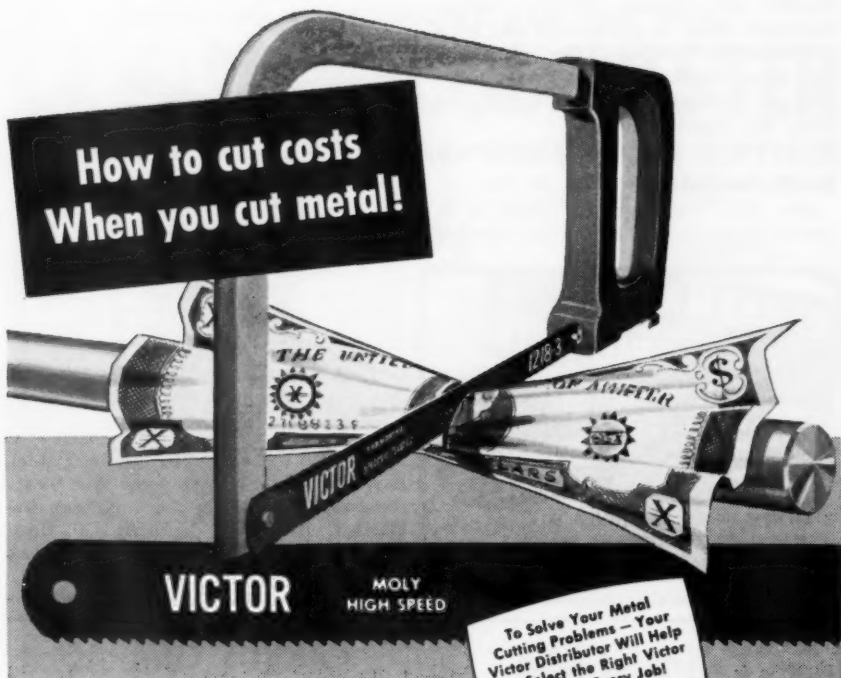
**THREAD GRINDING  
AND  
PRECISION MACHINING**

**WARD THREAD  
GRINDING COMPANY**  
265 Howard Ave. Bridgeport, Conn.

Circle No. 398 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

**How to cut costs  
When you cut metal!**



**To Solve Your Metal  
Cutting Problems — Your  
Victor Distributor Will Help  
You Select the Right Victor  
Blade For Every Job!**

**No magic — just common sense! Victor Saw Blades are Better Blades — Do the Job Faster, Easier ... Last Longer!**

Always specify Victor Blades for hand and power saws. It won't take long for you to see the difference ... on the production line and on the cost sheets!

Because Victor Blades are made better — to give you what you need for efficient, low-cost, high-speed operation. Victor Blades provide uniformity, proper hardness, efficient tooth design ... plus the convenience assured by ample set for clearance and clear, easy-to-read markings. These things add up to the reason why Victor is the best blade buy — everywhere!

**REMEMBER THESE 5 VITAL COST-CUTTING POINTS  
WHEN YOU ORDER SAW BLADES:**

- 1 UNIFORMITY** — Quality must be consistent ... in every blade.
- 2 HARDNESS** — Blades must be heat treated and tempered to the proper degree.
- 3 EFFICIENT TOOTH DESIGN** — For fast and efficient cutting.
- 4 BALANCED SET** — For clearance and accuracy of cut.
- 5 CLEAR MARKINGS** — For easier, quicker identification.

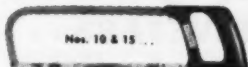
**AND REMEMBER:  
VICTOR GIVES YOU ALL 5!**



**SAW WORKS, INC. • MIDDLETOWN, N.Y., U.S.A.**  
*Makers of Hand and Power Hack Saw Blades, Frames  
and Metal and Wood Cutting Band Saw Blades*

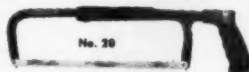
© 3200

**No. 10** — Yellow molded handle. Shaped for comfort. Almost indestructible!



Patented Lever-Lock positions, tensions blades automatically. **No. 15** — Red molded handle, chrome-plate finish. Same features as No. 10.

**No. 20** — Gunmetal Finish, features adjustable pistol-grip Frame, Lever-Lock for extra-easy blade change.



**FREE — FOR THE SHOP** ... the Victor Metal Cutting Chart — an invaluable on-the-spot guide for shop metal workers.

**FREE — FOR YOU** ... Victor's Handy **METAL CUTTING GUIDE** ... packed with valuable information on blade types, cutting techniques ... feeds and speeds ... plus important general metal cutting information.



**VICTOR SAW WORKS, INC.**  
Middletown, N. Y., U. S. A.

- ☐ Please send me the Victor Metal Cutting Chart  
☐ Please send me the Victor Metal Cutting Guide

Name \_\_\_\_\_ Title \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



sultant size signals operate colored tolerance lights in power unit and set a synchronized "memory" for later sorting. Good work flashes a green light. Federal Products Corp., Dept. JP, 1144 Eddy St., Providence, R.I.

Use ACTION Card, opposite page 64. Circle No. 95

### Drill bushings

Ace drill bushings are made of a special high-carbon chromium bearing



steel. With this new oil-hardening steel, coupled with precision in the heat treating process, bushing life has been increased. Ace Drill Bushing Co., Inc., Dept. KE, 5407 Fountain Ave., Los Angeles 29, Calif.

Use ACTION Card, opposite page 64. Circle No. 96

## DANNEMAN

*Precision*  
**DIE-SETS**

**Precision-Bored  
on Master Plates**



**CATALOG  
ON REQUEST**

**DANNEMAN DIE-SET DIVISION**  
ACME-DANNEMAN COMPANY, Inc.  
201 Lafayette St. New York 12, N. Y.

Circle No. 400 on Card, Opposite Page 65

## GRANT

### RIVETERS . .




**PIONEERS  
and  
PACEMAKERS  
in their line**

—head rivets from smallest to 1/2" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles

Write for literature and don't forget to send samples

**THE GRANT MFG. & MACHINE CO.**  
CE Station, Bridgeport 5, Conn.

Circle No. 401 on Card, Opposite Page 65

## PARVUS COMPAC

### Swiss made INDICATORS




- TWO TYPES Regular & Perpendicular
- 5 different models available
- All models are Ball Bearing mounted
- Interchangeable contact point, adjustable thru 180° reversible pressure
- No side play on contact point
- Unsurpassed repetitive accuracy

write for  
folder

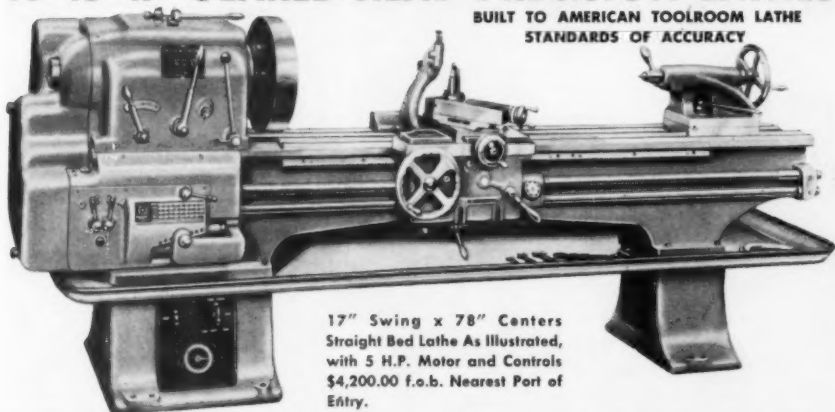
**BOREL & DUNNER**  
19313 Farmington Road  
Livonia, Michigan

Circle No. 402 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

See how much **MORE** you get with  
**CLAUSING-COLCHESTER**  
**13"-15"-17" GEARED-HEAD PRECISION LATHES**

BUILT TO AMERICAN TOOLROOM LATHE  
 STANDARDS OF ACCURACY



17" Swing x 78" Centers  
 Straight Bed Lathe As Illustrated,  
 with 5 H.P. Motor and Controls  
 \$4,200.00 f.o.b. Nearest Port of  
 Entry.

**BIG CAPACITY** — larger spindle capacities (see chart below). Swing for the gap bed models is 29" for the 17"; 25" for the 15"; and 19" for the 13". Between centers capacities: 78" for the 17" lathe; 30" and 48" for the 15"; and 24" and 36" for the 13". Geared-head drive powered by multiple V-belts.

**HEAVY-DUTY CONSTRUCTION** — Massive semi-steel beds with elliptical cross ribbing. Precision-ground V and flat ways — hardened ways available. Geared-head and quick-change box run in bath of oil, all gears shaved and hardened. Power feeds taken from separate feed rod, lead screw used only for screw cutting. Note size of spindles and spindle bearings (see chart in panel at right). Note, too, heavy-duty construction of tailstock, and of carriage assembly with double-walled apron.

**PRECISION PERFORMANCE** — built to American toolroom lathe standards of accuracy. Have GAMET MICRON tapered roller bearings . . . with oil flow

lubrication . . . most advanced and accurate bearings known to industry.

**PROMPT DELIVERIES** — through your authorized CLAUSING-COLCHESTER dealer.

**OUTSTANDING QUALITY and VALUE** — built by Europe's largest manufacturer of precision lathes . . . for over 50 years producers of lathes acknowledged the world over to be the finest value and the most accurate in their class! Backed by the coast-to-coast sales and service organization of one of America's leading machine tool manufacturers . . . CLAUSING.

**PRICES** — 13" cabinet base models, including motor and controls start at \$1875; 15" cabinet base at \$2650; 17" at \$4200. All f.o.b., nearest port of entry. 5 straight bed and 5 gap bed models available.

**WRITE FOR ILLUSTRATED LITERATURE**

**BIG SPINDLE  
 CAPACITIES**

CAPACITY	17"	15"	13"
THRU-HOLE	3 1/16"	2 1/16"	1 5/16"
NOSE TAPER			
KEY DRIVE	L-2	L-1	L-0

**BIGGER  
 BEARINGS**

GAMET MICRON precision taper roller bearings with oil flow lubrication . . . the most advanced and accurate bearings known to industry.

SIZE	17"	15"	13"
FRONT SPINDLE BEARING O.D.	7 1/8"	5 1/8"	4"

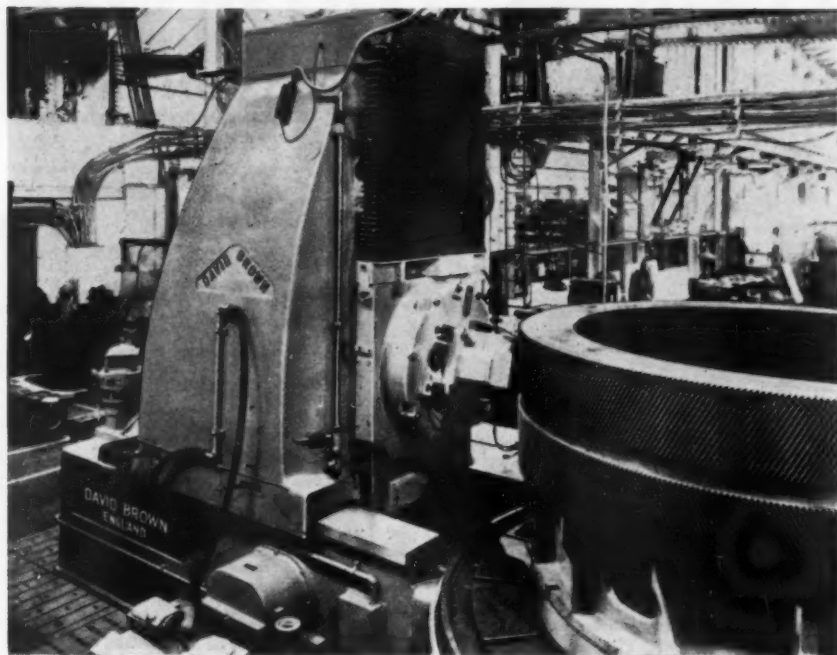
BUILT IN EUROPE'S LARGEST LATHE MANUFACTURING PLANT — BACKED, SOLD and SERVICED BY —

**CLAUSING** DIVISION **ATLAS PRESS COMPANY**

11-107 N. PITCHER ST. — KALAMAZOO, MICH.

Circle No. 403 on Card, Opposite Page 65

## Combined Hobber and Shaver For Large Gears

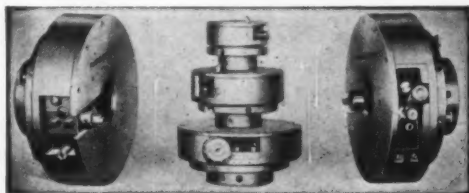


A combined turbine gear hobber and shaver has been introduced by Morey Machinery Co., Inc., Dept. MG, 383 Lafayette St., New York 3. Line includes machines capable of producing turbine gears from 60" to 175" diameter, and pinions and first reduction wheels from

6" to 60" diameter.

With these dual purpose machines, after completion of the hobbing process the hob is replaced by a shaving cutter attachment. The one machine can be kept fully employed.

Use ACTION Card, opposite page 64. Circle No. 97



### MUMMERT-DIXON FACING HEADS with Automatic Feed

One-way Tool Feed—6, 9 and 12" sizes.

Two-way Tool Feed—9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes.

Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

**MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.**

Circle No. 404 on Card, Opposite Page 65

# THE NEW WAY TO MARK EQUIPMENT...

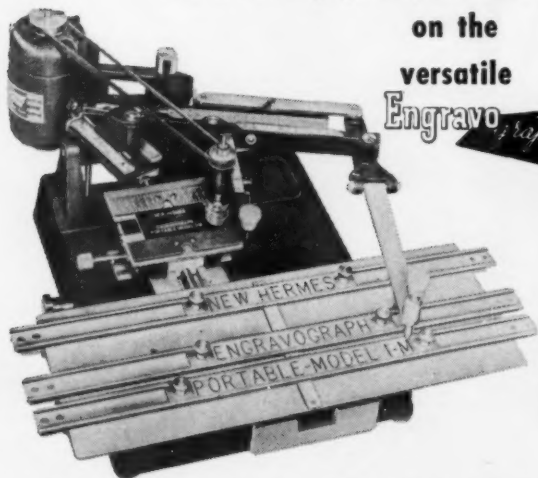
with

## GRAVO

*flex*

the first chip-proof, flexible engraving stock

on the  
versatile  
Engravograph



So simple to engrave Gravoflex. Lettering will stand out permanently on contrasting background. No paint needed.

10,000 Engravographs in use for engraving on metals and plastics. Only the Engravograph has these patented features:

- Adjustable for 15 ratios.
- Self-centering holding vise.
- Automatic depth regulator.
- Adjustable copy holders.

Send for booklets

Engravograph Booklet IM-28 • Gravoflex Booklet G-28

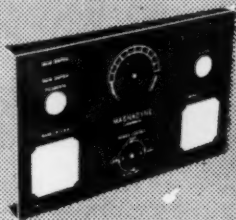
**NEW HERMES ENGRAVING MACHINE CORP.**

13-19 UNIVERSITY PLACE NEW YORK 3, N. Y.

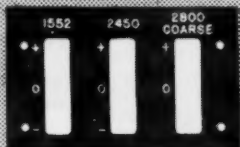
shear it



bend it



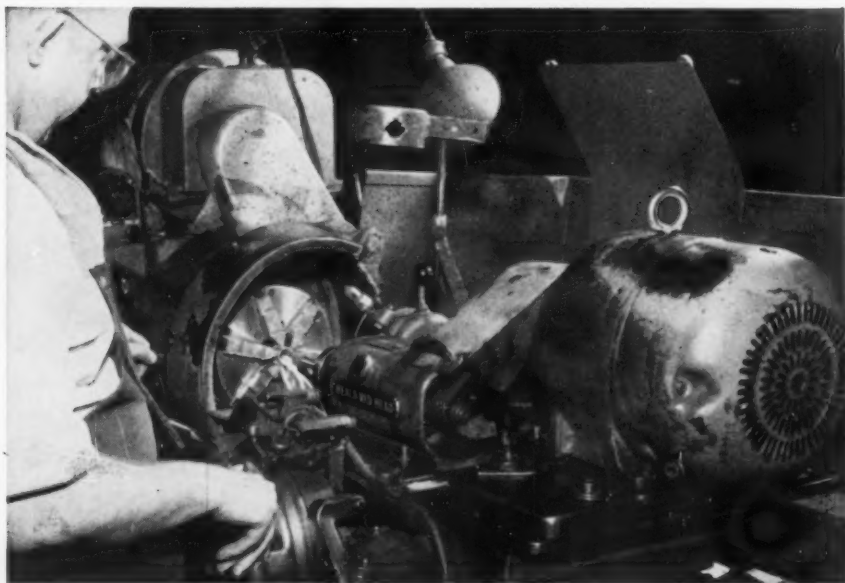
form it



punch it

# Buck CHUCKS

**"Hold O.D. and I.D. within  
.001" day in and day out."**



Buck Ajust-Tru chucks are ideal for precision grinding. Most recent report is from Mr. Chester Nelson, Supt. Press & Machine Div., J. I. Case Company, Bettendorf, Iowa. He writes —

"The part has been O.D. ground on a Centerless Grinder first, then the I.D. is ground by being held in the six (6) jaw Buck Chuck. The accuracy of the Buck Chuck is used to its fullest extent since the O.D. and I.D. have to be concentric within .001" total indicator runout. This tolerance is being held constantly day in and day out."

You, too, can handle precision grinding *faster and at less cost* with Buck Ajust-Tru chucks. Takes but a moment to send for literature — write today.

## **Do you use Power Chucks?**

Ask for information about the new Buck standard and Compensating chucks — up to 12".

## **BUCK TOOL COMPANY**

1112 SCHIPPERS LANE • KALAMAZOO, MICHIGAN

Circle No. 406 on Card, Opposite Page 65



# **COVEL** *Optical* **COMPARATOR**

**New, low-priced  
contour projector for  
quick, economical  
precision inspection**

**ONLY  
\$985<sup>00</sup>**

**FOR ACCURATE CHECKING  
RIGHT IN THE SHOP**

Large work capacity, sturdy, precision construction and optic arrangement which permits use in bright light in the shop. Ideal for shops using mechanical measuring methods because they haven't been able to afford the luxury of an optical comparator.

**SEND TODAY FOR  
DESCRIPTIVE BULLETIN B-116**



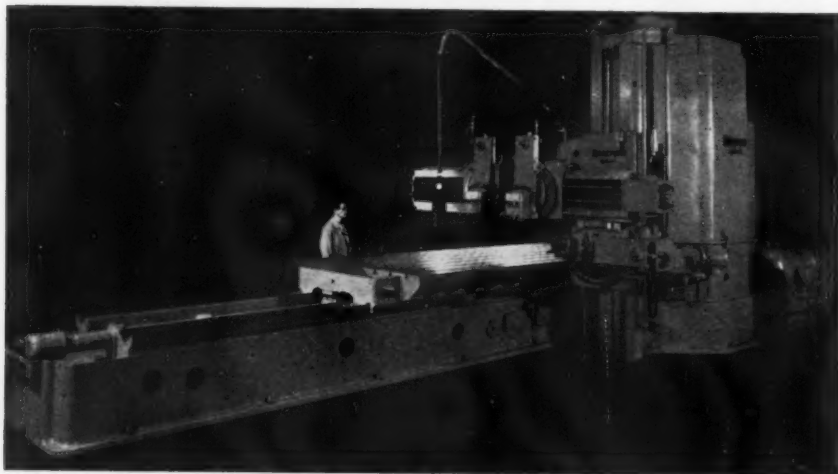
**COVEL** **MANUFACTURING COMPANY**  
**BENTON HARBOR, MICHIGAN**

Circle No. 407 on Card, Opposite Page 65

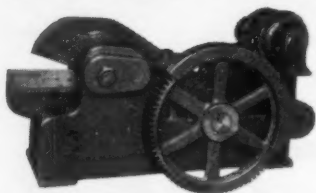


## Heavy Duty Planer Controlled from Pendant

The Rockford heavy-duty hydraulic planer has H-3 drive with Elecdraulic control. This refinement on the H-3 planer has H-3 drive with Elecdraulic drive makes it possible to actuate or



# Beloit



### ALLIGATOR SHEARS

These are high speed shears designed for heavy duty. Frames, levers and eccentric shafts are solid steel castings. Can be furnished with gear keyed to eccentric shaft for continuous operation, or mounted on legs with foot operated clutch shifter. WRITE FOR COMPLETE DETAILS.

*Buy  
Beloit*

**HENDLEY & WHITEMORE CO.**  
100 BLACKHAWK BLVD. • BELOIT, WIS.

Circle No. 408 on Card, Opposite Page 65

## ALL in ONE TOOLHEAD



BORING  
FACING  
TURNING  
GROOVING  
UNDER-  
CUTTING

SIX SIZES  
AVAILABLE

All Have Power Feed  
for Facing

Write today for  
complete details.

**CHANDLER TOOL CO.**  
Muncie, Indiana



Model "D"

COMBINED BORING & FACING TOOL HEADS  
**Chandler-Duplex**

Circle No. 409 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK



# Zagar

## Gearless Drill Heads

put **4** big advantages to work for you



Any number  
of holes



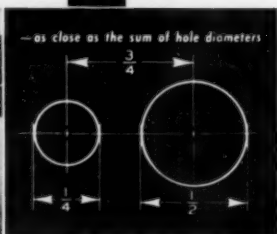
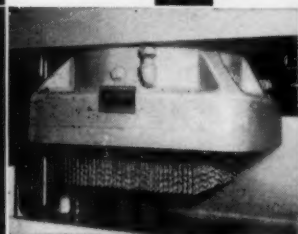
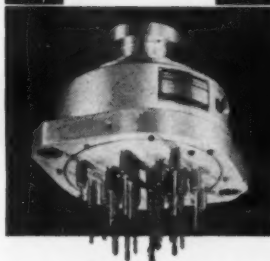
Any hole  
pattern



Any material



On all centers



**A Zagar drill head is never obsolete. Zagar can re-locate spindles for other hole patterns.**

Can you visualize the savings made possible by drilling up to 1000 holes at one pass? Zagar standard practice can handle any machinable material up to 1½" diameter. Holes of varying diameters can be drilled to form any pattern. Zagar Gearless Drill Heads, their efficiency proven by many years' success, can be installed on existing drill presses. Or, Zagar will lay out the necessary tooling for your entire job. May we see your sample parts and study your requirements? There is only one right answer—one best answer—for those requirements. May we supply it?

**ZAGAR, INC., 23900 LAKELAND BOULEVARD, CLEVELAND 23, OHIO**

# Zagar

**TOOLS FOR INDUSTRY and SPECIAL MACHINERY**

control all table and feed movements of the machine from the planer pendant.

Drive features three distinct ranges. A powerful drive at both high and low speeds, it combines the ruggedness and efficiency of the single circuit planer with the speed required for carbide planing. It has two hydraulic cylinders with different areas. Selector valves direct oil from the pump to either cylinder, or both in combination. Since the

pump delivery can be applied to three distinct areas, three force ranges are available with three inversely proportional speed ranges. The H-3 drive is a fully loaded reversing circuit, so the deceleration of the table and the work load is absorbed within the hydraulic system.

Acceleration of the table and the work load is absorbed within the hydraulic system. Acceleration is con-

# NEW

## Precise POWER QUILL®

### HIGH-CYCLE PERFORMANCE WITHOUT USE OF COSTLY HIGH-CYCLE EQUIPMENT

Continuously Variable Speed Range Through Electric Control with Simple Dial Calibration — 7000 to 25,000 RPM.

Largest and Most Powerful Available.

Super Accurate Collet Chuck with  $\frac{1}{2}$ " Capacity to Insure Maximum Rigidity for modern precision demands. (Available also with solid quill extension for mounting wheels to  $\frac{1}{2}$ " I.D. and  $2\frac{1}{2}$ " O.D.)

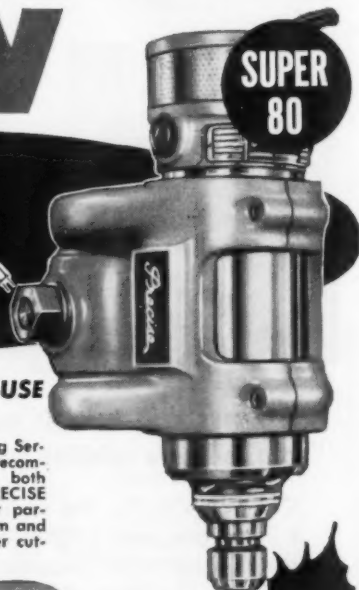
Unlimited adaptability to single or multiple grinding-milling operations . . . Tolerances of .0001".

Operates from standard 115V power supply.

Our Complete Engineering Service is available for recommendations and advice both on the application of PRECISE POWER QUILLS to your particular production problem and for the use of the proper cutting tool on your job.



Control cabinet permits speed regulation with meter calibrated in RPM.

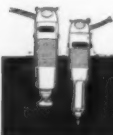


FULL

1 1/2

H.P.

AT THE  
QUILL



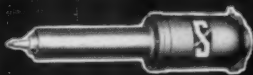
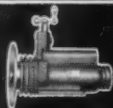
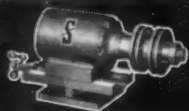
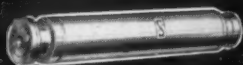
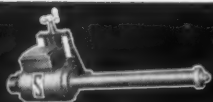
## Precise

### PRECISE PRODUCTS CORP.

3731 BLUE RIVER ROAD, RACINE, WISCONSIN  
QUALITY AND PRECISION SINCE 1882

Circle No. 411 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK



SINCE 1912



HALLMARK OF METALWORKING  
THROUGHOUT THE WORLD



**WHEREVER  
SPINDLES  
ARE  
NEEDED,  
STANDARD  
SUPPLIES  
THE  
FINEST!**

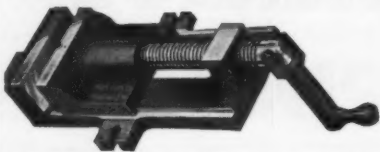
the **STANDARD**  
electrical tool co.

MAKERS OF 800 DIFFERENT SPINDLES...AND READY  
TO DESIGN 1000 MORE FOR INDUSTRY'S NEEDS!

WRITE TODAY: SUPER PRECISION SPINDLE DIVISION

2486 RIVER ROAD • CINCINNATI 4, OHIO

## YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, Inches	Opens Inches	Weight Pounds
1D	3½	4	12½
2D	5	5½	23

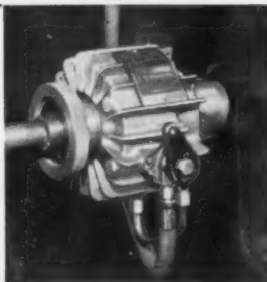
Do you need a vise of ANY type?

*Write today for bulletins on the extensive Yost line*

**YOST MFG. COMPANY**  
124 GRANT STREET  
CAMBRIDGE SPRINGS, PA.

Circle No. 413 on Card, Opposite Page 65

## WILSON AIR COLLET CLOSER



## STEP UP PRODUCTION 20% ↑

... for most lathes to 1" bar stock capacity

- Hold delicate parts without damage or adjustment
- Iron grip for heavy work
- No adjusting for stock or part variations
- Finger-tip or foot control eliminates operator fatigue
- Eliminates jarring of head stock

(Ten day FREE TRIAL to reliable firms)

**WILSON AIR COLLET CLOSER, INC.**  
909-B 40th Ave. NE, Minneapolis 21, Minn.

Circle No. 414 on Card, Opposite Page 65

trolled by the servo-operated reversing pump control. Reversals are smooth, shockless and accurate over the full range of cutting speeds available on the machine.

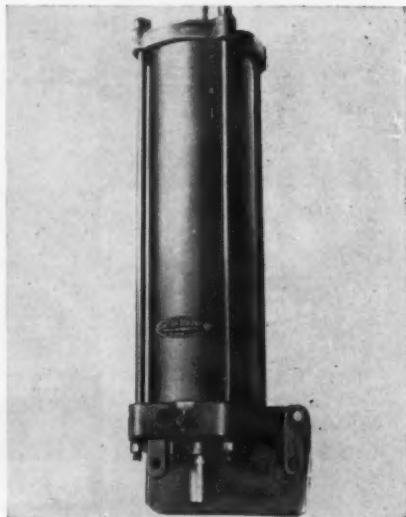
Cutting speed may be increased or decreased from the pendant by push button while the machine table is running. Stepless adjustment in all ranges, from 0 to maximum, is available. Range selection is by means of a selector switch on the pendant. Feed actuation, at either the start or the end of the normal cutting stroke, may also be selected by a switch on the pendant. Rockford Machine Tool Co., Dept. E, 2500 Kishwaukee St., Rockford, Ill.

Use ACTION Card, opposite page 64. Circle No. 98

## Counterbalance cylinders for punch presses

Model L power press counterbalance cylinders can be installed in any one of four universal methods.

They eliminate the ram drop or over-ride due to its own weight or the additional weight of the attached tools to the press ram. They reduce punch press



MACHINE and TOOL BLUE BOOK

brake wear caused by excessive brake pressure.

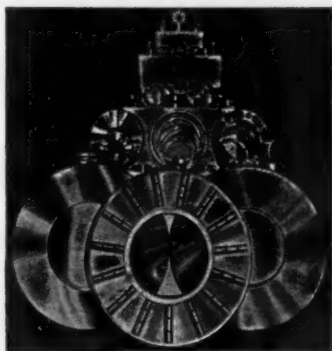
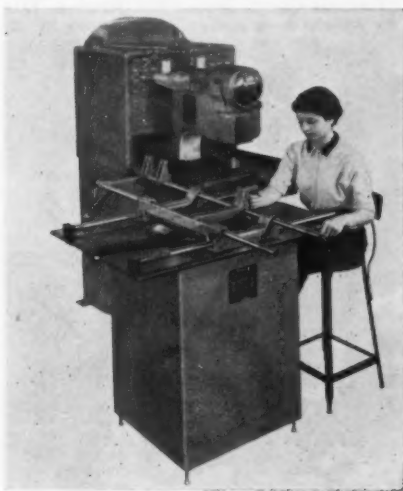
Snap-through or break-through is eliminated. This is commonly referred to as ram back-lash, caused by punch break-through which is very noticeable in blanking material like stainless steel, pre-tempered stock and other high tensile material. Counterbalance cylinders provide the same protection to a punch press as a door check provides to the average swinging door. Dayton Rogers Mfg. Co., 2824 13th Ave., So., Minneapolis 7C, Minn.

Use ACTION Card, opposite page 64. Circle No. 99

### Printed circuit punching machine

The Wales Model 10-AA fabricator has been redesigned for punching printed circuit boards.

Employing a pantograph-principle accessory called the "positive duplicator," the press reproduces any pattern of holes up to 15" x 25" area from a master template. Holes of any shape from .030" to 3½" diameter can be punched cold in most dielectric materials. Holes without cracks, halos or bell-mouth are assured by close-fitting guides which ac-



### All kinds of BALL & ROLLER THRUST BEARINGS

Flat . . . self aligning . . . double action . . . grooved . . . double direction. Can make bearings up to 25" diameter. Also equipped to repair and regrind bearings.

Immediate delivery on most bearings.

### ACORN BEARING COMPANY

(Established 1917)

68 Stanley Street

New Britain, Conn

Circle No. 415 on Card, Opposite Page 65

*the scale you can count on!*

**every shop needs one  
for counting small  
parts, estimating, or  
check  
weighing**



**AVAILABLE IN ALL WEIGHING STANDARDS**

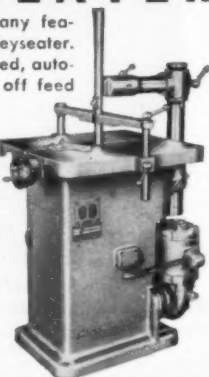
for further information write:

**OHUS**  
SCALE CORPORATION  
1050 COMMERCIAL AVE.  
UNION, NEW JERSEY

Circle No. 416 on Card, Opposite Page 65

## MORRISON 1" AUTOMATIC KEYSEATER

Investigate the many features of this new Keyseater. It has automatic feed, automatic stop to cut off feed at given depth, automatic relief to back the work away from the cutter, automatic centering, automatic lubrication and no bushings required. Write for more information on the finest Keyseater on the market.



**THE D. C. MORRISON CO.**

P. O. BOX 1017C • CINCINNATI 1, OHIO

Circle No. 417 on Card, Opposite Page 65



Executive head of large plastics firm

**"My firm saves \$27,000 annually with specially designed ESSEX carbide burrs."**

"Before we switched to ESSEX tools, we spent \$45,000 yearly for high speed burrs. ESSEX carbide burrs, made to our specific needs, cost us only \$18,000 — an annual saving of \$27,000!"

Find out how ESSEX carbide tools can help you. Write for free, 12-page illustrated catalog today.

**ESSEX ROTARY FILE & TOOL CORP.**  
295 Madison Ave., N.Y.C. 17, MTBB-56

My name .....  
Company .....  
Address .....  
City ..... Zone ..... State .....

Circle No. 418 on Card, Opposite Page 65

curately align the punch tip with the die.

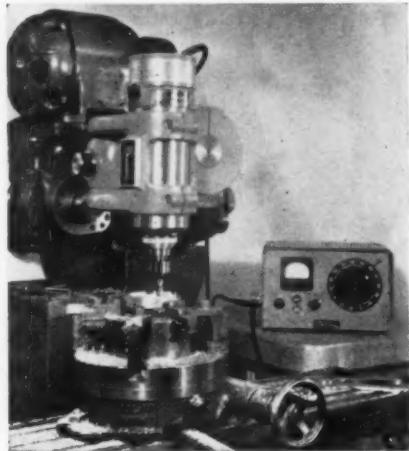
Both template and workpiece are located by means of precision ground locator pins. The template is clamped in the positive duplicator when its reference holes are located on the template pins and the workpiece is located by its reference holes on the pilot pin work holders.

As the duplicator stylus is moved to hole locations in the template, the pantograph carriage correspondingly positions the workpiece under the fabricator punch holder. Depression of the stylus into each template hole electrically actuates the punching mechanism of the press. Wales-Strippit Co., Dept. DR, North Tonawanda, N.Y.

Use ACTION Card, opposite page 64. Circle No. 100

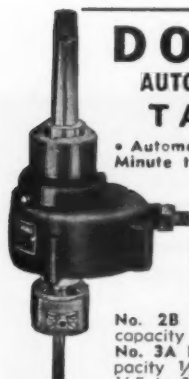
## Giant power quill

A heavy-duty power quill, the Super 80, develops a full 1½ h.p. at the quill and provides a continuously variable speed range from 7000 to 25,000 r.p.m. An electric speed control with a simple dial permits easy selection of the exact speed desired. Precision collet chuck has a capacity to ½". Milling, grinding or finishing to tolerances of .0001". Precise Products Corp., Dept. RB, Racine, Wis. Use ACTION Card, opposite page 64. Circle No. 101



MACHINE and TOOL BLUE BOOK





## DORMAN AUTOMATIC REVERSE TAPPERS

- Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY.

No. 1A FRICTION DRIVE TAPPER — capacity No. 2-56 to  $\frac{3}{8}$ " in Steel— $\frac{1}{2}$ " in Aluminum.

No. 2B POSITIVE TAPPER — capacity  $\frac{3}{8}$ " to  $\frac{7}{8}$ " in Steel

No. 3A POSITIVE TAPPER—capacity  $\frac{1}{2}$ " to  $1\frac{1}{4}$ " in Steel— $\frac{1}{2}$ " to  $\frac{3}{4}$ " Pipe Taps

No. 4A TAPPER—capacity  $\frac{3}{4}$ " to 2" in Steel including Pipe Taps.

- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

Priced from  
**\$55.00**

Write for  
Bulletin  
IMMEDIATE  
DELIVERY

THRIFTMASTER PRODUCTS CORPORATION

Division of Thomson Industries, Inc.

1030 N. PLUM STREET, LANCASTER, PA.

STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

Circle No. 419 on Card, Opposite Page 65

*Hammond*  
OF KALAMAZOO

Model  
"400"



**HORIZONTAL  
or VERTICAL**

**4"  
ABRASIVE  
BELT GRINDER**

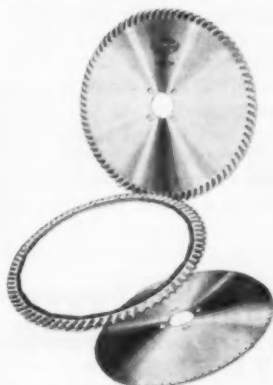
Eliminate costly hand filing, grinding, deburring and many other operations . . . There are "101" applications for the 400 in your plant. Write for bulletin.

*Hammond Machinery Builders*

1614 Douglas Avenue

Kalamazoo 54, Michigan

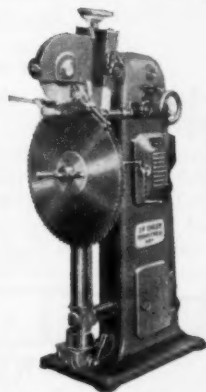
Circle No. 420 on Card, Opposite Page 65



## Ohler

### SEGMENTAL SAW BLADES AND SAW SHARPENING MACHINES

by the originators of  
SEGMENTAL TYPE SAW BLADES  
with  
CURVED TOOTH FORM  
for  
TRIPLE CHIP CUTTING



Send for Price List and new descriptive Catalog on Segmental Saw Blades which contains invaluable information for your Purchasing Department and those responsible for obtaining economies in the use and proper maintenance of Segmental Saw Blades.

EXCLUSIVE FACTORY AGENT

**JAMES W. GEORGE MACHINERY CO.**  
519 E. Jefferson Ave. Detroit 26, Mich.

OR YOUR DEALER

Circle No. 421 on Card, Opposite Page 65



## Lathe's Spindle Speeds Controlled by Push Button

Spindle speeds can be changed instantly by push-button control on the Hardinge DV59 high speed precision lathe. The variable speed drive provides a range of 230 to 3500 rpm. Speed indicator shows exact speed at all times.

A ball-bearing, lever-operated collet closer assures fast, easy and positive gripping. Operator can open or close a collet or step chuck while the machine is in operation. Collet tension is immediately adjustable throughout the full range of light to heavy holding power, without the use of tools. Collet capacity, 1-1/16". Hardinge Brothers, Inc., Dept. RS, Elmira, N.Y.

Use ACTION Card, opposite page 64, Circle No. 102

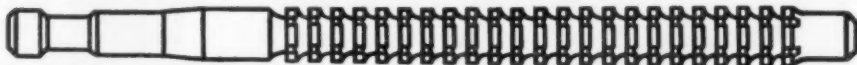
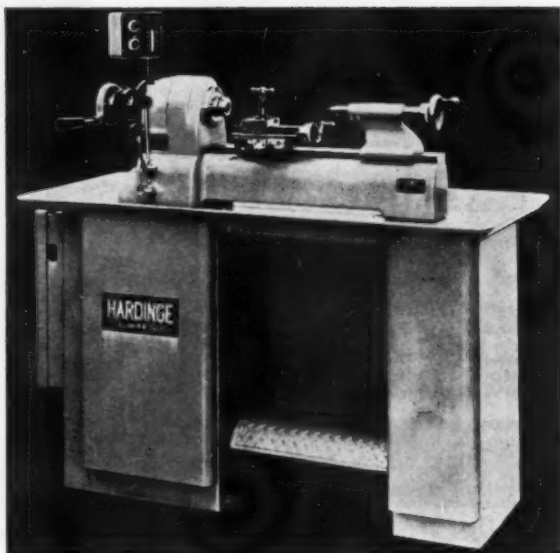
### Internal ball thread segments

Internal ball thread segments for checking the size of internally threaded circulating ball nuts have been developed by the Bryant Gage and Spindle Division, Box 620, Dept. JP, Springfield,

Vt. These segments are used with the Bryant No. 21 portable thread gage.

Each segment carries three balls located adjacent to each other in a helical groove corresponding to the pitch of the internal ball thread to be checked. The balls in opposite segments are 180° apart giving a direct reading of diameter and providing a quick positive centering action.

The circulating ball nuts checked are



### BROACHES & FIXTURES

Conant offers complete engineering and manufacturing facilities for your broaching needs. Expertly designed for proper strength and chip carrying capacity. Prompt broach sharpening and reconditioning service. Order standard keyway broaches from our stock. Your inquiry invited. Send us part prints for recommendation and quotation.

**CONANT BROACH COMPANY**  
347 W. 107th ST.  
CHICAGO, ILLINOIS

Circle No. 422 on Card, Opposite Page 65



*to economize*  
**STANDARDIZE**  
*with*

# RING



precision **PUNCHES** and **DIES**



Ring Standardized Punches and Dies offer cost saving dependable performance for all of your perforating problems.

Precision volume production to rigid specifications offers

- ★ Low cost
- ★ Complete interchangeability
- ★ Immediate shipments from stock on Standards plus prompt delivery on Specials
- ★ High quality — long life

**MANY SHAPES AND TYPES**



ROUND



SQUARE



OBLONG



HEXAGON



RECTANGULAR

Blanks — Pilots — Headless — Shoulder and Bevel Head Quills — Slug Ejector Punches — Transfer Punches

**NEW!**

Tough — Accurate Retainers for Ring Punches and Dies mount easily to your die set.  
 Available in Key Type for irregular shapes.

WRITE FOR OUR ILLUSTRATED CATALOG



## RING PUNCH & DIE COMPANY

27 Fenton Place

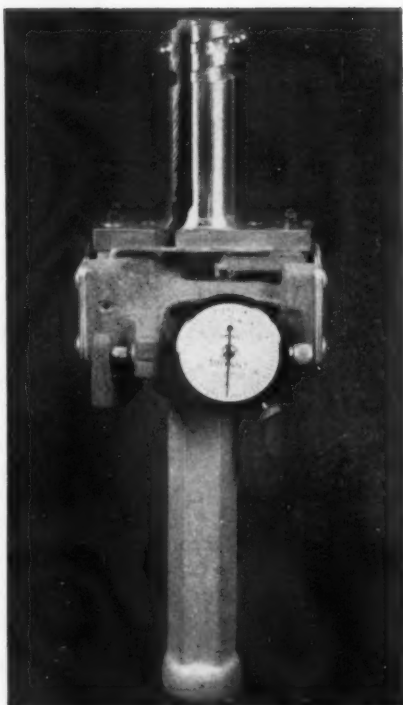
Jamestown, N. Y.



## COLLIS COLLET EQUIPMENT

★ COLLIS Equipment fills today's important production needs so well because they are made by men skilled in making this type of equipment. Supply the proper unit from a complete range of types and sizes for Drill Sleeves and Sockets, Lathe Centers, Chuck Arbors, and Drill Drifts. We will handle your orders promptly.

**THE COLLIS COMPANY**  
DEPT. A, CLINTON, IOWA  
Circle No. 424 on Card, Opposite Page 65



used in ball bearing screw assemblies for the actuation of landing gears, power steering and similar applications.

Use ACTION Card, opposite page 64. Circle No. 103

### Carbide pusher pads

Balas Collet Mfg. Co., Dept. RH, Cleveland 14, O. has announced a new



## SPELLMACO "SPOTTERS"

A matched set of transfer punches  
for toolmakers, machinists & tool cribs

Used for transferring location of threaded, drilled  
and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for  
long life—.0025 undersize to facilitate use—Black oxide finish.

SET #3-17; 28 punches with indexed stand—sizes 3/32" to 1/2", by 1/64"—  
plus handy 17/64" size. Length 4 7/8". ONLY \$17.90.  
Single sizes available

**R. L. SPELLMAN CO. — URBANA, OHIO**

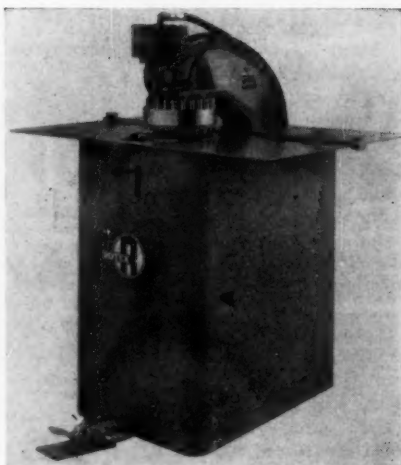
Circle No. 425 on Card, Opposite Page 65

line of solid tungsten carbide pusher pads for its standard Model A master pushers. Their bearing surface is non-scratching, non-wearing, non-galling. A wide variety of standard sizes are available for use on most makes of machines.

Use ACTION Card, opposite page 64, Circle No. 104

### Air-hydraulic turret punch

Turret punch Model 18-AH is air hydraulically operated and is capable of punching a two-inch hole in 12-



gauge mild steel or in 14-gauge stainless steel. It supplies 18 stations ranging from 5/32" to 2". Oiling system is self-loading. Rotex Punch Co., 2350 Alvarado St., San Leandro, Calif.

Use ACTION Card, opposite page 64, Circle No. 105

## JIG BORING

and

**Large Precision Machining  
Done to your specifications**

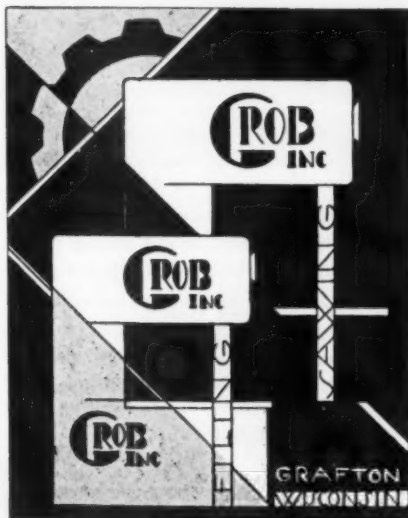
**WE HAVE 21 JIG BORERS**

**KIDDE PRECISION TOOL CORP.**

25 LOCUST AVE.

ROSELAND, N.J.

Circle No. 426 on Card, Opposite Page 65

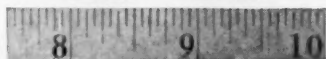


GROB INC.,

GRAFTON, WISC.

Circle No. 427 on Card, Opposite Page 65

November, 1956



**Name of Part—Brush Holder  
Material—Leaded Brass**

**Cuts—1/8x3/16x1/2 slot  
1/4x3/8 "T" Slot with 1/4"  
Neck**

**Above cuts previously done in 3 operations  
that took 20 seconds/Complete Piece  
Now done in one operation that takes 3 seconds/Complete Piece**

*Name of Conn. Mfr. On Request*

**THE F. HALLOCK COMPANY**

"BROACHING SPECIALISTS"

116 Main Street

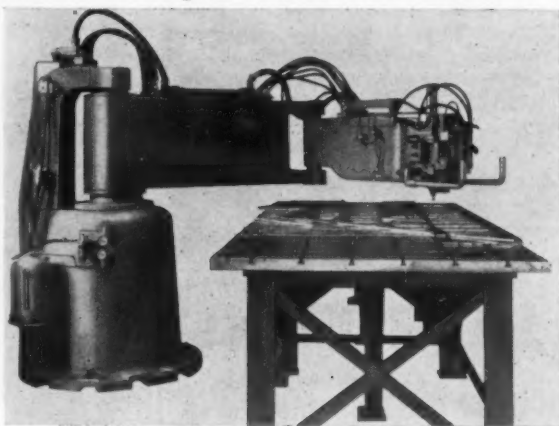
Derby, Conn.

Circle No. 428 on Card, Opposite Page 65

## Radial-Arm Machine Shapes Aircraft Parts

Many airframe parts are made by simply cutting away large portions of an aluminum plate in order to leave the complex form desired. This calls for a machine with a high-speed spindle and a cutter capable of routing difficult contours and milling various shapes to different depths.

The Ekstrom-Carlson depth and contour mill consists of a column-like base carrying a jointed radial arm. At the end of the arm is mounted a cutter motor which is available with adjustable speeds as high as 14,000 rpm to as low as 3600. A T-slotted table under the arm holds the aluminum slab to be machined.

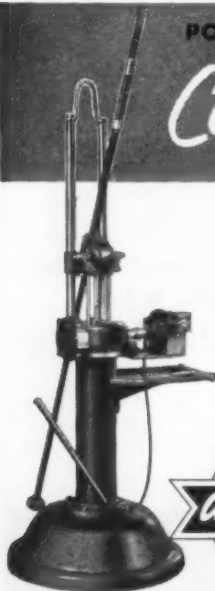


Machine comes in two sizes: No. 480 has a maximum arm extension of 120" from column center to spindle center and a 60" x 120" worktable. The No. 484

### POWER SCRAPER

# Cuts Production Costs...

... 5 HOUR JOB CUT TO 50 MINUTES



One manufacturer was scraping flat pieces measuring 18 by 24 inches... each piece requiring 5 hours to scrape by hand. An Anderson Power Scraper cut scraping time to 50 minutes! That meant a substantial saving in production costs and another happy Anderson customer. Let us help you estimate how much this portable, easy-to-use power scraper will save for you.



Today, Write for Bulletin 11-5

ANDERSON BROS. MFG. CO., Rockford, Ill.

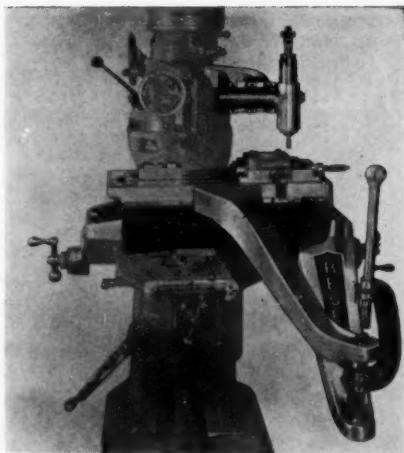
has a maximum arm reach of 60" and a 30" x 60" work table. The arms are so pivoted that they have an extensive swing at each joint, so that the cutter can be easily and quickly moved all over the worktable area and some distance beyond. Ekstrom, Carlson & Co., Dept. RB, Rockford, Ill.

Use ACTION Card, opposite page 64. Circle No. 106

### Duplicator table has adjustable friction brake

Incorporation of an adjustable friction brake allows the operator of the Regent duplicator table, by turning a simple adjusting screw, to select the sensitivity desired for each particular operation. Circular ball bearing raceways on both longitudinal and cross travel slides make for smoother table movement.

Table is available with overarm to fit the new Bridgeport ram type machine, as well as the round overarm type machine. Users can do intricate



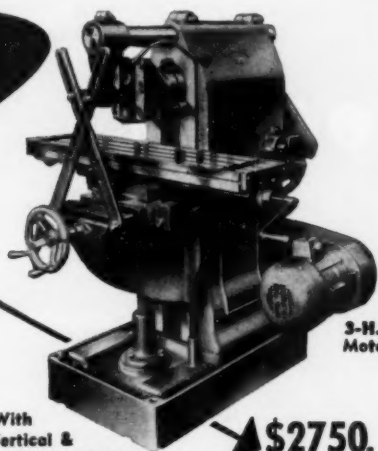
three dimensional milling on such products as punches, dies and plastic molds of all types. J. M. Kalins & Co., 1575 Railroad Ave., Bridgeport, Conn.

Use ACTION Card, opposite page 64. Circle No. 107

## The Bradley MILLER for ECONOMY

Looking for a well built miller, designed for long life and precision work at a low price? Look no further . . . as the Bradley Miller has all these qualities. Equipped with a vertical head and slotting attachment. Working table surface area is 46" x 10". Automatic feed longitudinal, 36½". 10" vertical adjustment. Weighs 3,000 lbs. and occupies a 70" x 60" floor space. Further details mailed on request. Write today. No obligation.

**Some Territories Open**



3-H.P.  
Motor

With  
Vertical &  
Slotting ATC Head

➤ **\$2750.**  
**DELIVERED**

**BRADLEY MACHINERY COMPANY**

23440 Woodward Ave., Detroit 20, Mich.  
Telephone Lincoln 7-3030



## Attention Executives

Before You Buy  
Precision Measuring Instruments

### CONSULT **OPTO-METRIC**

*Specialists in Dimensional  
Quality Control and Exclusive  
Representatives for*

● **Leitz**

Optical Measuring Tools  
Optical Dividing Heads  
Optical Rotary Tables  
Internal/External Gages  
Toolmakers Microscopes

● **Wilder**

Optical Comparators

● **GAGE**

"Deep Etch" Comparator  
Charts.

*Write for Descriptive Literature*

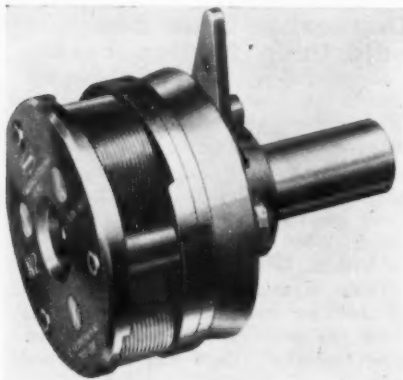
**OPTO-METRIC TOOLS,  
INC.**

137 Varick Street • New York 13, N. Y.

Circle No. 431 on Card, Opposite Page 65

### **Stationary-revolving type self-opening thread rolling heads**

Series N self-opening thread rolling heads may be used in either rotating or non-rotating holding spindles and are adaptable to use on almost any



type of lathe, automatic, threading machine, drill press or similar equipment. When used as a non-rotating head, opening is by pull-off method with resetting by hand-lever; as a rotating type head, operation is by outside yoke.

The series includes four head sizes covering capacities from 1/16" to 3/4". The National Acme Co., Dept. RH, Cleveland 8, O.

Use ACTION Card, opposite page 64. Circle No. 108

### **Digital read-out automatic micrometer**

With the Model HDR Carson-Dice digital read-out electronic micrometer the exact dimension of a part is determined without influence from human variables. Setting the instrument is effected by an electronic circuit which responds to instant of contact between the micrometer anvil and the work before any pressure is built up on the work by the micrometer screw.

Inexact or uncertain use of muscular power in positioning the work or ro-

MACHINE and TOOL BLUE BOOK





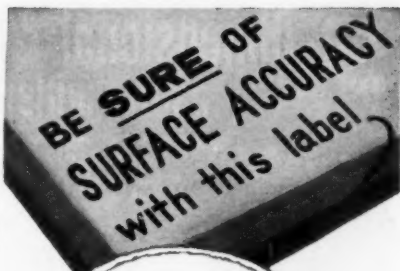
tating micrometer dials is replaced by a motor drive which automatically brings the micrometer precisely to the point of contact at a speed far faster than can be done manually.

The digital read-out counter on the front of the instrument displays the exact reading in ten-thousandths of an inch. Five divisions between each digit on the unit wheel permits readings to 20 millionths of an inch. J. W. Dice Co., Dept. DR, Englewood, N.J.

Use ACTION Card, opposite page 64. Circle No. 109

### Vertical milling machine has automatic traverse

The Imperial Model M-1 milling machine has a heavily ribbed frame and a head practically free of noise and vibrations. Machine is finished to Schlesinger tolerances. The vertical head swings up to 90° in each direction. The angular position of the head is indicated on a graduated scale. Vertical position is specially locked. The spindle is adjustable and its movement is limited by a stop. Fine adjustment by worm gearing and hand-wheel after



#### \*Balanced Granite

Quartz, the hardest mineral found in granite is present in Herman Granite in just the right proportions to provide a smooth abrasion-free working surface. This quartz in pure crystal form can be seen easily in Herman Pink Surface Plates.

#### \*Registered Accuracy

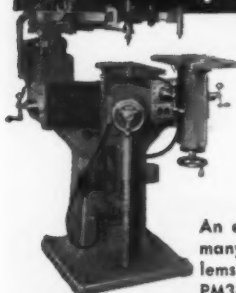
Inspection is with Auto-Collimator used in controlled atmosphere. All tolerance is above datum plane for extra accuracy. A plotted graph signed by Herman inspectors shows accuracy is within your specified limits and plate is registered by serial number at our factory.

write for descriptive folder.



Circle No. 432 on Card, Opposite Page 65

## 3-Dimensional panto-miller



Accurate panto-graphic milling on either flat or curved surfaces.

*New*

**CAPACITY  
SENSITIVITY  
ACCURACY  
CONTROL**

An economical answer to many production problems. Send for Bulletin PM3-A.

## 2-Dimensional panto-miller



Versatile and dependable for continuous service, the J&B "Panto-Miller" 2A:

**ENGRAVES  
PROFILES  
DIE CUTS  
MILLS**

Write for Bulletin PM2-A.

## 3-WAY Indexing Trunnion

Simple, Rapid, Positive positioning of workpiece or jig for all angle Drilling, Tapping, or Counter-boring. Available with Chuck, Faceplate, or Right-Angle Adaptor Plate. Complete with Station Selector. For details, ask for Bulletin IT3-A.



WITH  
FACE  
PLATE



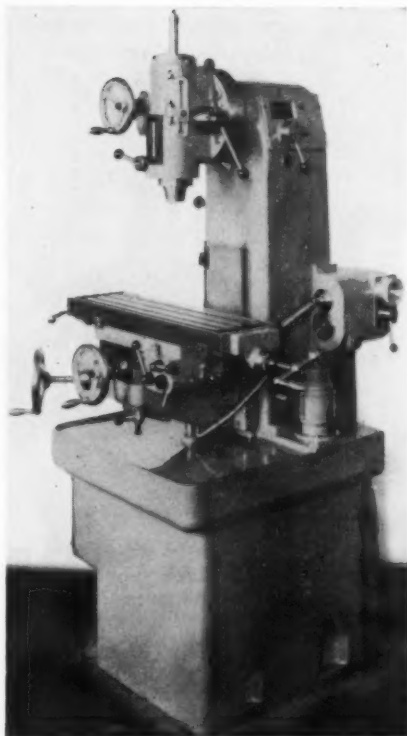
WITH  
RIGHT ANGLE ADAPTOR



**JOHNSON & BASSETT INC.**  
PRODUCTION TOOL DIVISION  
WORCESTER, MASSACHUSETTS

Circle No. 433 on Card, Opposite Page 65

284



disengaging the clutch; rough adjustment by hand wheel.

Milling spindle drive: From 1½ hp, 2-speed motor by V-belts over a back gear or directly over V-belts.

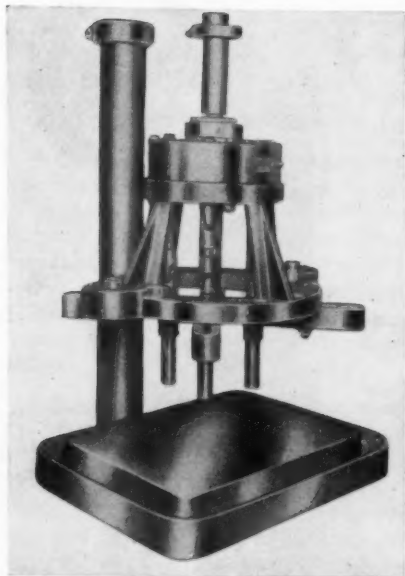
Feeds and table movement: Six automatic feeds range from 0.47 to 9.85 inches per minute. Adjustable stops disengage the automatic movement instantaneously. Aaron Machinery Co., Inc., 45 Crosby Street, New York 12, N.Y.

Use ACTION Card, opposite page 64. Circle No. 110

## Adjustable drilling head

Overall length of the No. 2 universal joint adjustable drilling head is 20". Guide bars bushed for 1" or 1½" pins on 17½" centers. Diameter of lower clamping ring is 15½". Minimum centers

MACHINE and TOOL BLUE BOOK



1 5/8", maximum diameter pattern 9 3/4".

All spindles hardened and ground with gears turned on spindles. Drive gear has heavy duty grooved ball thrust bearings on top and bottom of gear and heavy duty roller bearings top and bottom. All drill spindles have double needle bearings in locator arm and heavy duty grooved ball thrust bearings. Errington Mechanical Laboratory, Inc., Dept. DR, Staten Island 4, N.Y.

Use ACTION Card, opposite page 64. Circle No. 111

### Press has extra die space

The Model 2E obi 15-ton Rousselle press is built for heavy, continuous production and features an increased die space of 12 inches (from bed to slide with stroke down and adjustment up). Roller bearing flywheel is mounted on stout crankshaft and supported by a rigid frame. Adjustable ram guides maintain true alignment.

Bearings are of generous size and easily replaced. Clutch mechanism is

## MIDWEST PORTABLE Elevating Table **SAVES TIME** *Leaves hands free*



2000 LBS. OR \*1000 LBS. CAPACITIES  
\*ILLUSTRATED

### A precision made MIDWEST TABLE Costs no more!

- ✓ It's hydraulic . . . positions work or feeds at desired height without use of hands
- ✓ Rigid cast construction
- ✓ Top turns 360° and clamps tight
- ✓ Foot release valve to lower
- ✓ Machined top surface can be used as work table
- ✓ Roller bearing casters with ball bearing swivels
- ✓ Floor clamping available extra

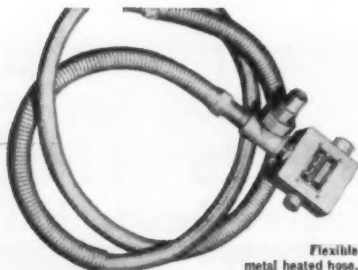
Write today . . . specials on request

**MIDWEST**  
TOOL & ENGINEERING CO.

112 WEBSTER ST., DAYTON 2, OHIO

Circle No. 434 on Card, Opposite Page 65

285



Flexible  
metal heated hose.

**Sta-Warm** electrically  
heated hose conveys  
melted compounds!

You can accurately dispense more melted compound per minute or per hour if you convey it through a STA-WARM electrically heated hose. The hose prevents critical temperature drop of contents before it is dispensed. The temperature in the hose is manually adjusted by a rheostat.



In lengths up to 12 feet, STA-WARM heated hose is made of rubber for temperatures up to 200°; or, in bronze or steel, or with Teflon liner, for temperatures up to 450°F. It is useful for dispensing pre-melted wax, paraffin, plastics, insulating materials, potting compound, hot oil or lacquer, etc.

Also available to round out a practical heated assembly are STA-WARM heated valves, heated pipe, and numerous sizes and styles of compound melting tanks with gravity or pressure feed to the pipe or hose, with agitators and accurate temperature controls, and with other accessories of practical value to the user of melted compounds.

Inquire today for detailed catalog information, or, outline your current melting or dispensing problem.

**Sta-Warm**  
**ELECTRIC CO.**  
756 N. CHESTNUT ST., RAVENNA, OHIO  
Subsidiary of ABRASIVE & METAL PRODUCTS CO.

Circle No. 435 on Card, Opposite Page 65



oversize and can be set for single stroke or continuous operation. Service Machine Co., Dept. HS, 2310 W. 78th St., Chicago 20, Ill.

Use ACTION Card, opposite page 64. Circle No. 112

## Clamping system

Clamp-All parallels, a clamping system for holding operations on all types of machines, have interchangeable jaws, which handle a wide range of workpieces. Individual parallels are finished to a tolerance of .0002".

Parallels consist of a Meehanite parallel bar and six attachments. The D jaw, for vertical holding of rounds or shapes; the E jaws, for horizontal clamping of rounds or shapes; B clamp, which fulcrums on the lower hinge and is held in place with a hardened ground pin located in holes jig-bored through two sides of the parallels and through the

## Screw Machine Attachment Eliminates Secondary Marking Operations

Automatic die marking of part numbers, patent numbers, trade marks, etc., during the operating cycle of automatic and hand operated screw machines, bench and turret lathes, etc., on almost any surface of a part is possible with the complete line of automatic roll markers available from New Method Steel Stamps, Inc., 147 Joseph Campau, Detroit 7, Michigan.

Suitable for both light and heavy work, the markers are practically foolproof and eliminate the need for separate setups for marking, thus reducing cost, scrap, etc. Quick interchangeable roll dies give remarkable versatility and reduce time for setup changeover.

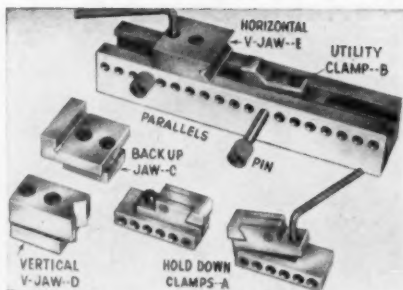


Model 500-C for automatically marking on outside cylindrical surface of screw machine parts, manufactured by New Method Steel Stamps.

New Method marking units are being used in leading screw machine shops throughout the country to mark millions of parts annually at costs of a fraction of a cent per part.

Illustrated is one of the three basic models of the cost cutting markers. Model 700 (not shown) is for marking and cutting off at the same time. The marker occupies the cut-off slide, leaving other stations open for machining operations. New Method also manufactures a complete line of hand stamps, inspectors' stamps, embossing dies, marking hammers, type and type holders, etc. Precision marking and engraving services available.

For complete information and descriptive bulletin, write New Method Steel Stamps, Inc., 147 Joseph Campau, Detroit 7, Michigan.



base of the clamp which slides in the slot of the parallels; A hold-down clamps, developed with a spring loaded feature so that when tightening on the screw, these clamps push in and down. Capacity from 0 to 12 inches. Also available in matched pairs with a maximum opening of 65". Jerico, Dept. RB, 4744 W. Lake St., Chicago 44, Ill.

Use ACTION Card, opposite page 64. Circle No. 113

## Soft-blank top jaws

All-American soft-blank top jaws are made in sizes for medium and heavy duty and both standard height and extra high—for self-centering, universal scroll, independent and scroll combination chucks made to American standard specifications.

Jaws are manufactured from low carbon steel. The keyways are precision machined and jaws are drilled and counterbored for standard socket-head screws. Du Page Machine Co., Box 204-B, Elmhurst, Ill.

Use ACTION Card, opposite page 64. Circle No. 114



Circle No. 436 on Card, Opposite Page 65

November, 1956

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## Variable Speed Engine, Tool Room Lathe



CARROLL-JAMIESON 16" VARIABLE SPEED  
ENGINE AND TOOL ROOM LATHE  
MODEL VS

The C & J Model VS 16" variable speed engine and tool room lathe offers infinitely variable spindle speeds from 30 to 1500 rpm. Spindle is belt driven running in extra width Timken bearings. Triple vee link belts supply good

pulling power for both production and toolroom requirements. Geared range of speeds available for heaviest turning operations.

Gear box provides 48 separate threads and feeds with thread range from 3 to



When you think of small  
END MILLS — think of  
MICRO MINIATURES

**THE RIGHT TOOL FOR THE JOB  
IS HALF THE JOB** — An Old Axiom Still True

THE RIGHT TOOL  
FOR A SMALL END  
MILL JOB IS A —

**MICRO MINIATURE  
END MILL**

DISTRIBUTORS IN PRINCIPAL CITIES

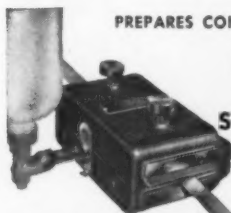
**WOODSON TOOL CO.** 4811 Lennox Blvd. Inglewood, Calif.

Write for  
Catalog



184 per inch. Separate levers control longitudinal and crossfeed positive type clutches. Large crossfeed and compound rest dials graduated to 250 thousandths. Both feed rod and lead screw are provided. This model can also be furnished to swing 18" with bed lengths available to 14 feet. The Carroll-Jamieson Machine Tool Co., Dept. JS, Batavia, Ohio.

Use ACTION Card, opposite page 64. Circle No. 115



#### PREPARES COIL STOCK FOR PRESS

New Low Cost  
**LIGHT-DUTY  
OILER-  
STRAIGHTENER**  
**\$95.00**

Handles stock  
up to 3" wide,  
1/8" (app.) thick

Write for details

**JACO DEVICES, INC.**

90 High St., Hingham, Mass.

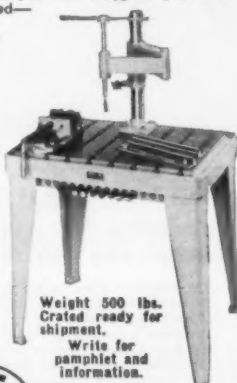
Circle No. 438 on Card, Opposite Page 65

### Try this Allman Universal Hand Tapper FREE for 15 days—

Results have proved that once this tapper is in your shop or tool-room and you find 70% of your free hand tapping time saved—

it will stay there!  
The new Allman hand tapper has these advantages:

- Articulate arm swings clear of large table for placement of work.
- Limitless number and sizes of tapped holes without moving work piece.
- Vise holds work as small as 3/8" square
- Floating tap locates itself in hole
- Individual spindle holds taps, thus change requires only seconds.



Weight 500 lbs.  
Crated ready for  
shipment.

Write for  
pamphlet and  
information.

**TOOLS,  
INC.**

1735 No. 25th Ave. • Melrose Park, Ill.

Circle No. 439 on Card, Opposite Page 65

November, 1956



**OSLUND**  
**UNIVERSAL  
INDICATOR  
and  
HOLDER**

### INDICATOR'S ADVANTAGES

1. 360° Scale Visible From All Sides
2. Shockproof Throughout Entire Mechanism
3. Constant Accuracy

### HOLDER'S ADVANTAGES

1. Equipped with two screws . . . one for approximate setting, the other for final adjustment.
2. A turn of swivel clamp and indicator works to 5" diameter . . . with extension bar to 15".

Write for illustrated Folders

Dealers: Several territories open

Direct all inquiries to our:

National Distributor:

NICKSON TOOL SALES CO.

170 Washington Ave., North Haven, Conn.

Manufactured by:

**OSLUND**  
**PRECISION PRODUCTS**

15 SIGOURNEY STREET • HARTFORD 5, CONN.

Circle No. 440 on Card, Opposite Page 65

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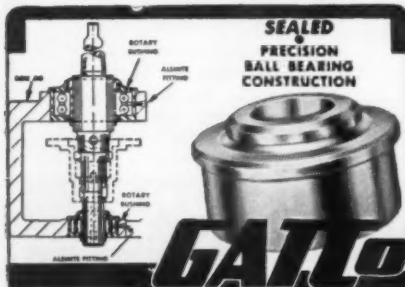
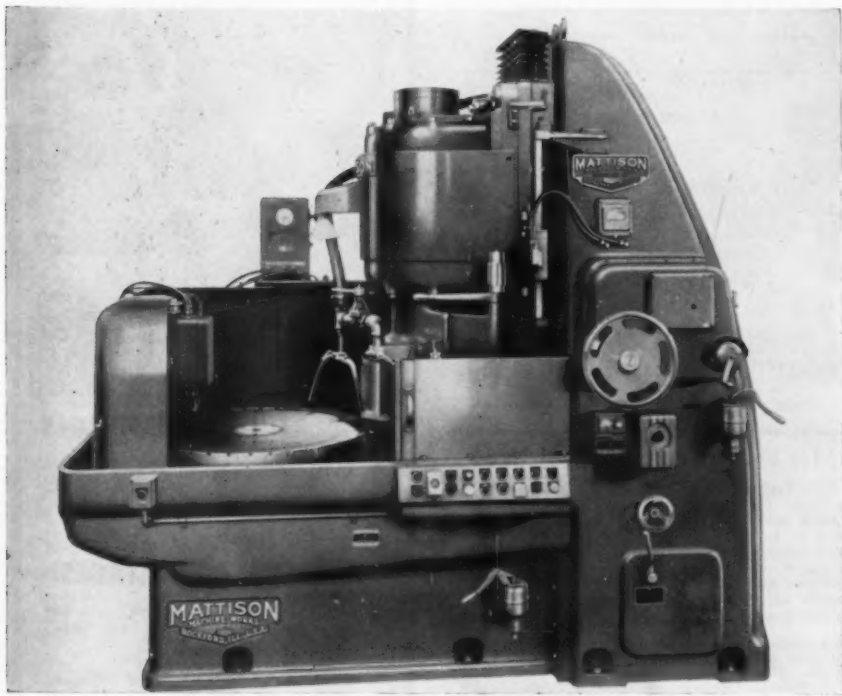


## Grinder Increases Accuracy and Production

Mattison Models 24 and 36 vertical rotary surface grinders have been redesigned to increase stock removal rates and accommodate new types of work requiring closer tolerances.

Automatic cycling is available, and

includes: switching on the coolant pump; moving table into grinding position; magnetizing table and starting it rotating; feeding to size, according to gaging system; sparking out, and returning all elements of the machine to



**SEALED  
PRECISION  
BALL BEARING  
CONSTRUCTION**

### **ROTARY BUSHINGS FOR DRILLING, CORE DRILLING ROUGH AND FINISHED BORING**

The inner race of the GATCO bushing rotates with the tool, piloting and tool accurately below or above the work—or both.

Eliminates expensive tool construction—Reduces tool wear—Prevents seizure and pilot breakage—Especially adapted where precision is required.

*Write for full information and prices*

### **ROTARY BUSHINGS**

423 ANN ARBOR ROAD, U.S. 12, PLYMOUTH, MICH.  
Telephone PLYMOUTH 1472

Circle No. 441 on Card, Opposite Page 65



## COMBINED DRILLS



## and COUNTERSINKS

- Both old and new series carried in stock for immediate delivery. Finest high speed steel. Ground spiral flutes. New standard simplifies and improves size progression. New comparison chart mailed on request. Shows new standard sizes—both plain and bell type. Specials to your blue prints.

Jobbers' Inquiries Invited

### KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

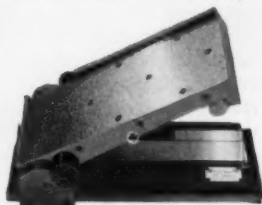
Circle No. 442 on Card, Opposite Page 65

Precision • Convenience • Economy

## HINGED SINE PLATES

5" and

10" . . . AT LOW COST



Bald Eagle Sine Plates are Guaranteed Accurate within .0002" in center distance and parallelism for length of tool. Double normalized for maximum stability. Adapted for permanent magnetic chuck. No. 1810 has .1000" recess and heavy duty side rail.

Positive Locking  
Device  
Precision Ground  
Hardened Rolls  
Immediate Shipment

No.	Center Dist.	Top Width	Price
1805	5"	3"	\$109.50
1810	10"	5"	265.00

FOB St. Paul

Write for literature on complete line.  
Order from your dealer or direct.

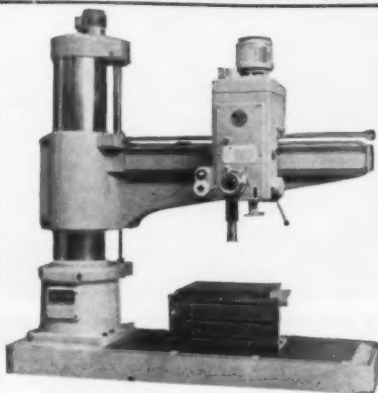


**Bald Eagle Corp.**

(Formerly Bald Eagle Tool Co.)

356 Cedar St. • St. Paul 1, Minn.

Circle No. 443 on Card, Opposite Page 65



## "WEBO"

WORLD FAMOUS  
RADIAL AND UPRIGHT  
DRILLING MACHINES

ECONOMICAL AND  
EFFICIENT

LET US QUOTE ON  
YOUR DRILLING  
MACHINE NEEDS.



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NEW ENGLAND & ATLANTIC STATES  
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CENTRAL & WESTERN STATES  
JAMES W. GEORGE MACHINERY CO.  
519 EAST JEFFERSON AVENUE  
DETROIT 26, MICHIGAN

Circle No. 444 on Card, Opposite Page 65

loading position. The air-gaging system measures the work continuously and gives the operator visual indication that parts are approaching size. The micro-switch automatic sizing system is an electro-mechanical measuring device which measures the work continuously and actuates the automatic cycle at the completion of the grind. The machine is then ready for the next load.

A new continuous down feed system

eliminates troublesome mechanical linkages and increases the range of feeds. On many jobs horsepower and wheel capacity are the only factors limiting the feed rate.

Redesigned base is stronger and more rigid, with added cross-girths. The coolant tank is now separate from the machine so changes in coolant temperature cannot affect its accuracy. Mattison Machine Works, Dept. RB, 545 Blackhawk Park Ave., Rockford, Ill.

Use ACTION Card, opposite page 64. Circle No. 118

**NIELSEN**  
**Heavy Duty**  
*Live Centers*

Write for catalog on live centers



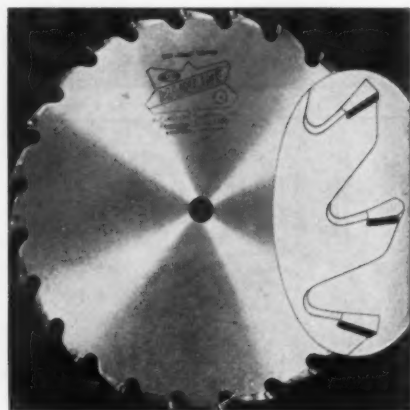
Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

**NIELSEN, INC.** LAWTON, MICH.

Circle No. 445 on Card, Opposite Page 65

### Saws have alternating double-beveled, straight raker teeth

A new line of carbide tipped saws has been introduced by the W. F. Meyers Co., Dept. HS, Bedford, Ind.,



**The "MASTER COMPAR"** **INDICATING MICROMETER COMPARATOR**  
*has the VISIBLE feel*

No Arguments as to correctness of reading due to "feel". Use it as Comparator, Master Micrometer, Go & No Go Gage. 1" Range reading in 1/10,000"

To obtain permanent accuracy at these close limits, highest precision workmanship and exclusive design of mechanism are of Major importance and ONLY found in "MASTER COMPAR"

**A RIGHT HAND TOOL**  
Release button for movable Anvils on RIGHT Hand side enables you to hold feel the conventional way.  
**NEW** — Resetting to Zero in 5 seconds.  
Quick adjustable tolerance heads. Heavy TUNGSTEN CARBIDE Anvils will actually measure Out-of-Roundness, Ovalness and Taper.

**0-1" SIZE IN HARDWOOD CASE**  
**\$105**  
Also Available in LARGER SIZES

Ask for Illustrated Circular — Code GIOFF. Sold thru Tool Supply Houses Ask for Demonstration

**GEORGE SCHERR CO., INC.** 200-MT LAFAYETTE STREET • NEW YORK 12, N.Y.

Circle No. 446 on Card, Opposite Page 65

## BORING TOOLS



Tools that will cut their own head diameter clean, running on dead center, proving they do have proper clearance.

No need to grind the heads of these tools away to make them cut clean.

And two-flutes to give 100% more usable cutting head.

Guaranteed to be good

Send for literature and prices.

**A. B. CRALEY & SON**  
60 KNIGHT AVENUE  
CLEMENTON, N.J.



"Jorgensen"

and "Pony"

**CLAMPS**

Ask Your Supplier

send for free 32-page catalog  
the clamp folks / **ADJUSTABLE CLAMP CO.**  
403 N. Ashland, Chicago 22, Ill.

Circle No. 447 on Card, Opposite Page 65



**Handle your small  
part precision  
JIG BORING  
on the  
LINLEY  
JIG BORER**

Why tie up your big, costly jig borers on small work when you can get maximum utility at less cost per hour on a machine exactly fitted to your work. Put your small work on the LINLEY where it belongs and reserve your large machines for large work, where large work belongs. You'll save money this way.

**SPECIFICATIONS:**  
Table Movement:  
6"x10"  
Table Size  
7"x17½"

Complete details sent  
promptly on request

**LINLEY BROTHERS CO.**

663 State St. Ext., Bridgeport 1, Conn.

Circle No. 448 on Card, Opposite Page 65  
November, 1956

**LIVE CENTER  
ACTION WITH  
DEAD CENTER  
ACCURACY**

USE



**ANTI-SCORING  
LUBRICANTS**



**PROVE IT TO  
YOURSELF IN  
YOUR OWN PLANT FOR ONE  
DOLLAR AND THIS COUPON!**

Free-running on dead centers—with **COMPLETE** protection. CMD Lubricants are **CONCENTRATED**, form a "tough" film—absolutely **NO GALLING** or **SEIZING**—under the heaviest load. **STABILIZED** for added "oiliness" giving longer, smoother runs without slip-stick action. It all adds up to **LIVE CENTER ACTION** with **DEAD CENTER PRECISION**. The bigger the job, the better you'll like it.

**TRIAL ORDER—  
TWO FOUR OZ. TUBES \$1.00**

Send me my order of CMD right away!

Bill me ☐ Bill my company ☐

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Chicago Manufacturing and Distributing Co.  
1906 West 16th St., Chicago 9, Illinois

**CHICAGO MANUFACTURING  
AND DISTRIBUTING CO.**

Circle No. 449 on Card, Opposite Page 65

known as the Meyco Mainline Uni-Chip. The Uni-Chip feature consists of alternating double-beveled and straight raker teeth, for long life in the cutting teeth and smooth, chip-cleaning with the straight raker teeth. Saws come in several diameters and with different number of teeth.

Use ACTION Card, opposite page 64. Circle No. 117

### Boring chuck set bores holes from 5/32" to 5"

This boring chuck set will bore any size hole from 5/32" to 5". A 1/2" to 3/4" reducer bushing makes possible the use of either 1/2" shank or 3/4" shank tool bits. Bits are available in either high speed steel or carbide. A large dial with 50 graduations increases the hole .001" in diameter per graduation.

The chuck will start behind center for small holes and move 3/4" plus. The slide can be unclamped, moved and re-clamped in exacting increments. Appropriate shank adapters permit use of



chuck set with all machines with No. 40 tapers and with all Bridgeport millers. Moore Special Tool Co., Inc., Dept. DR, 740 Union Ave., Bridgeport, Conn.

Use ACTION Card, opposite page 64. Circle No. 118

### Mold your own LEAD HAMMERS

Here's the inexpensive, fast way of molding and remolding your own lead hammers with this COOK mold and ladle. It produces hammers that can "take it". Simple to operate.



Write  
for circular  
and prices

LAWRENCE H. COOK, INC.

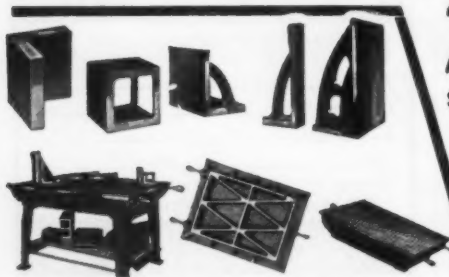
67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

### Stock reel

This portable hitch feed stock reel is capable of handling coils from 4" i.d. to 10" i.d. weighing up to 50 lb. They may be 1/4" to 2 1/2" wide.

A time saving feature is self-centering of the coil, new reels may be loaded in minutes.

Adjustable head may be located anywhere on post for most convenient feed. Three sizes of side supporting discs



### "MILWAUKEE" Precision EQUIPMENT

SURFACE PLATES—ANGLES—  
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Made from highest grade semi-steel—designed and finished for true dimensional accuracy.

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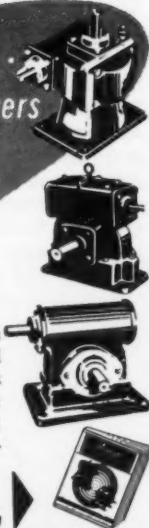
Engineers & Machinists Since 1907

165 S. Berclay St., Milwaukee 4, Wis.

Circle No. 450 on Card, Opposite Page 65

**Abart** .....

has over 75 answers  
to your speed  
reduction  
problems



There are over 75 types and sizes of Abart Speed Reducers you can select from stock. Ratings: 1/50 to 168 hp. Ratios: up to 10,000 to 1. Specials to order.

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pocket-size catalog

**ABART GEAR & MACHINE CO.**

4829 West 16th Street • Chicago 50, Illinois

Circle No. 451 on Card, Opposite Page 65

**WHOOT  
MON!**



You really get your money's worth when you buy precision screw machine products made by "you know W.H.O."

CAP SCREWS • COUPLING BOLTS  
SET SCREWS • MILLED STUDS

... our specialty.

*W. H. O'Connell Co.*  
YORK, PENNA.

Circle No. 452 on Card, Opposite Page 65

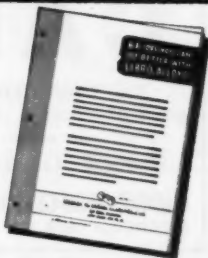
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If your problem is a metal-working operation such as securing shaft bearings; anchoring magnets in chucks, instruments, etc.; providing fusible element in safety devices; soldering delicate assemblies; or any one of some 63 industrial tasks that are being done efficiently and economically by Cerro Alloys, send for this folder.

It lists all the known practical applications of Cerro Alloys, the well-known group of low-temperature melting alloys and tells you how you can obtain detailed information on the particular task in which you are interested. Send for your copy of this valuable reference folder today.



**CERRO DE PASCO CORPORATION**

300 Park Avenue  
Room 1501,  
New York 22, N.Y.

Circle No. 453 on Card, Opposite Page 65





### Double acting air press

Famco's double acting air press was designed to permit increased vertical heights, throat depth, and ram stroke. Reinforced, double acting air cylinders support unlimited upper die weights and permit faster operating cycles. Double rod ends allow for adjustment of stroke from 0 to maximum stroke of cylinder. Ram is supported and guided independently of cylinder piston rod and is keyed to prevent turning.

Ram housing is adjustable in 2" increments up to 6" total adjustment to

are available—16", 20", and 24". H. E. Dickerman Mfg. Co., Dept. DR, 321 Albany St., Springfield, Mass.

Use ACTION Card, opposite page 64. Circle No. 119

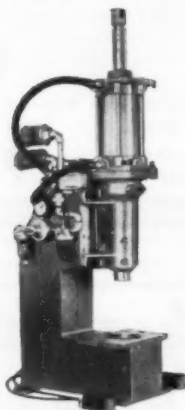
## CAMS

To Your Specifications  
except Screw Machine Cams

Design Assistance Offered

KIDDE PRECISION TOOL CORP.  
25 LOCUST AVE. ROSELAND, N.J.

Circle No. 454 on Card, Opposite Page 65



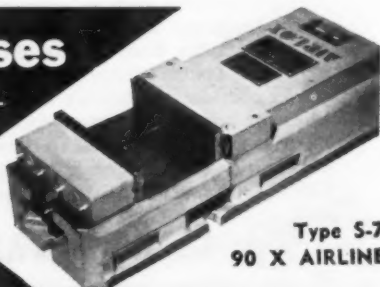
allow for variation of shut height on individual machine. Famco Machine Co., Dept. RB, 3100 Sheridan Rd., Kenosha, Wis.

Use ACTION Card, opposite page 64. Circle No. 120

## AIRLOX air vices

— PARTICULARLY FOR MILLING —  
AIR OPERATED WEDGE WITH LEVERS  
DELIVERS GRIP OF 50 TO 200  
X AIRLINE

PRODUCTION DEVICES, INC.  
WHITEHALL, N.Y. Tel. 40



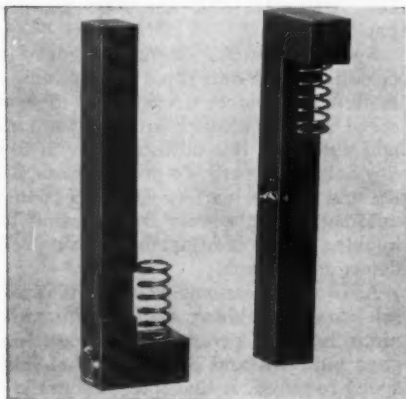
Type S-7  
90 X AIRLINE

Circle No. 455 on Card, Opposite Page 65



## Primary finger stops available in larger sizes

Applied Mechanics Corp., Dept. JS, 462 Lyon, N.E., Grand Rapids, Mich., is now manufacturing the new Amcor primary finger stops for those in need of thicker sizes than can now be found on the market.



A new completely different type of construction was developed to maintain quality and strength while keeping the price in line.

For convenience and quick service, distributors throughout the country are stocking a complete supply of all sizes:  $\frac{1}{8}$ ",  $\frac{3}{16}$ ",  $\frac{1}{4}$ ",  $\frac{5}{16}$ ", and  $\frac{3}{8}$ ".

Use ACTION Card, opposite page 64, Circle No. 121

## Use Latest Method When Building Dies

This new method of checking tapers on dies does away with die squares and height gauges.

Are you getting what you pay for? Check side angles of your dies for long life. Do it quickly with a Die Checker.

Write for complete details

**TIETZMANN TOOL CORP.**  
D.C. 1 Englewood, Ohio



Cincinnati  
Centerless  
Tool

*when only  
a diamond tool  
will do the job...  
ASCO has  
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The right diamond for the right tool. Manufacturers: diamond tools, wheels, compound. Importers & dealers: carbons, boriz, ballas. WRITE TODAY FOR FREE CATALOGS & LITERATURE.

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Specialists in diamonds and diamond tools since 1908.  
111 Eighth Ave., New York 11  
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Circle No. 456 on Card, Opposite Page 65



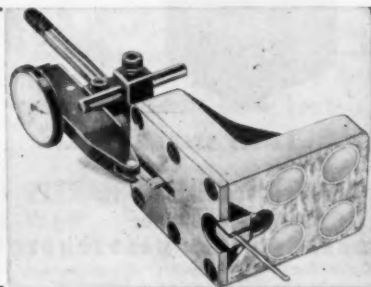
## GEARS

**In Stock—Immediate Delivery**

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.

**Send for Complete Catalog No. 18  
CHICAGO GEAR WORKS**  
440-50 N. Oakley Blvd., Chicago 12, Ill.

Circle No. 457 on Card, Opposite Page 65



Circle No. 458 on Card, Opposite Page 65

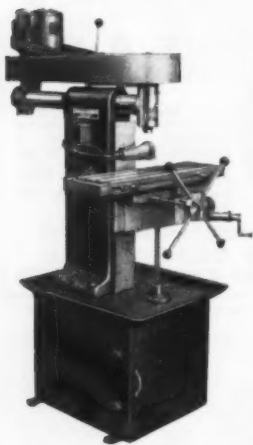
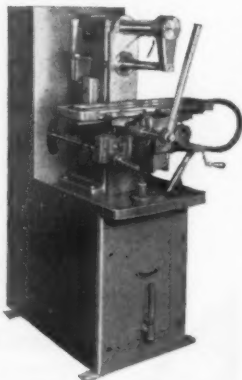
# VERSATILITY

## HORIZONTAL

**Tool Room—**

**Production**

Precision built—  
Hand scraped and  
flaked ways • Ta-  
pered gib • 5½"  
x 24" table •  
power or air to  
table • Lead  
screw and rack  
on the same mill  
• No. 10 B&S  
Taper • 1" arbor  
• 2 HP Motor • 8½"x28" table available.



## VERTICAL

**Production—**

**Tool Room**

8½"x28" Table  
with air or power  
feed • Tolerances  
within .0005" •  
Exclusive screw  
type rack w/ Ex-  
centro gear ad-  
justment. • Head  
w/ or w/o quill  
travel • Screw  
feed available.

**PRICES START AT \$880.00**

**CROWNSHIELD - HARRIS CO.**  
711 COUNTRY CLUB RD. EST. 1906  
GREENFIELD, MASSACHUSETTS

Circle No. 459 on Card, Opposite Page 65

## Hobbing simplified with hydraulic presses

An improved line of hydraulic hobbing presses with capacities up to 5000 tons has been introduced by Haller, Inc., Dept. JS, Plymouth, Mich. Smallest press in the line is a 100-ton unit normally supplied with a hand operated 2-stage pressure pump. Other presses: 250, 500, 1000, 2000, 3200 and 5000 ton capacity units.

Special features include hydraulic circuits that permit rapid closing, automatic change-over from high to low speed at light contact between the hob and a die, and fine adjustment with the low hobbing speeds. To provide flexibility and a wide variety of applications, automatic change-over from closing to hobbing speeds is adjustable within predetermined limits.

A contact manometer permits preselection of hobbing depth and maximum hobbing pressure. A measuring gage indicates and determines hobbing speed required. A dial indicator graduated in increments of 0.001" has a measuring range of two inches—end measures increase this range if desired. After the preselected depth and pressure has been reached, the hobbing operation is automatically interrupted.

Use ACTION Card, opposite page 64. Circle No. 122

## Chip breaker grinder

This chip breaker grinder, Model CM-6W, is offered as a single end chip breaker grinder only or as a combination chip breaker and diamond finishing grinder. Grinder incorporates a self-contained pump and tank unit with special no-splash guarding. A flood of coolant is provided, giving continuous cool cutting, increasing diamond wheel life, and eliminating dust problems.

Recommended for light or intermittent duty grinding, the new model has a ½ hp built-in drive motor; accommodates 6" dia. chip breaker wheels and with cup wheel arrangement uses a 6" dia. cup wheel. Any-angle vise

with four swivel adjustments is furnished on the chip breaker end, providing all angular settings and accommodating tools up to 2½".

Head raising and lowering adjustments by micrometer dial calibrated to .001". Cross slide, with micrometer screw and dial calibrated to .001" moved on dovetail ways with adjustable gib. Carriage slides have protecting guards, and carriage reciprocating lever is adjustable for strokes up to 7".

Equipped with brake lever for quick spindle stopping. Tilting work table on cup wheel end adjusts from 30 above to 30 below horizontal, with table moving in by screw feed. Hammond Machinery Builders, Inc., Dept. HS, 1614 Douglas Ave., Kalamazoo, Mich.

Use ACTION Card, opposite page 64. Circle No. 123

### Flute grinder

The Blake flute grinder gives tap users a means of controlling rake angle on the cutting edges of their taps, and



**STEEL PRODUCTS**

FLAT BOTTOM  
**WOODRUFF KEYS**



**MACHINE KEYS**



**TAPER PINS**



*the Quality Line*

of Precision Made Steel Products

**KEYS-ALL TYPES • COTTER PINS**  
**TAPER PINS • STRAIGHT PINS**  
**MACHINE RACK • SPECIAL PARTS**

**KOOLHEAD Foundry Chill Nails**

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DESCRIPTION  
and PRICES

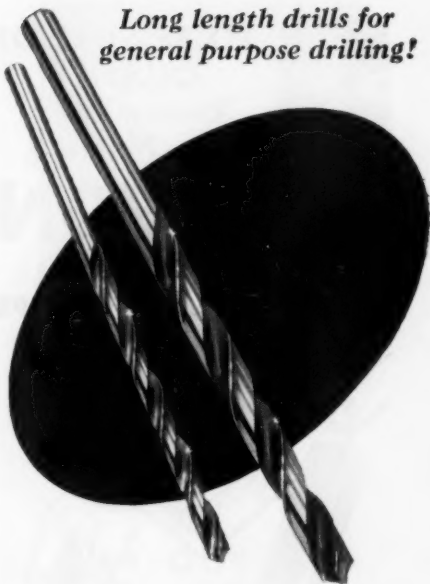
**STANDARD**

*HORSE NAIL CORP*

NEW BRUNSWICK, N.J.

Circle No. 460 on Card, Opposite Page 65  
November, 1956

**Long length drills for  
general purpose drilling!**



# ACE

## TAPER LENGTH DRILLS

Feature for feature, you can't beat Ace Taper Length Drills. First, because they're made of the finest quality high speed steel properly heat treated to assure the ultimate in uniform hardness. Second, because they're produced by the Ace-originated "ground-from-the-solid" process to give them smoother, more highly polished flutes with keener, stronger cutting edges. And finally, because they cut faster, last longer, give you more production per drill at lower cost.

Call your local Ace Drill Distributor today!



## ACE DRILL

ADRIAN, MICHIGAN

ORIGINATORS OF "GROUND-FROM-THE-SOLID" DRILLS

Circle No. 461 on Card, Opposite Page 65



TO BE SURE OF  
QUALITY  
Remember  
the Name ↓

# HOGGSON

**STEEL  
STAMPS**



**CHAMFERED  
CORNERS**  
*for locating  
the base*

**FINEST  
STEEL**

*long  
life*

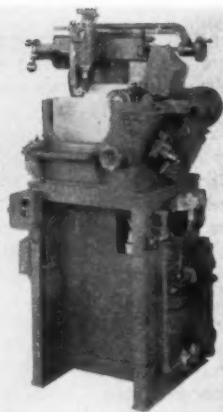


**ALSO IN  
REVERSE  
FOR  
MOLDS  
& DIES**

Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

**HOGGSON & PETTIS MFG. CO.**  
141H Brewery St. New Haven 7, Conn.

Circle No. 462 on Card, Opposite Page 65



thus enables them to obtain the correct cutting angle, according to the material to which the tap is used. The machine also corrects any minor errors in the indexing. Tap makers use these machines in the production grinding of spiral pointed taps, thus giving the tap user taps that have accurately balanced flutes.

Machine is equipped with air operation of the vertical slide, resulting in smoother finish, increased output and less operator fatigue. The operator has only to control the depth of grind. Edward Blake Co., Inc., Dept. DR, 437 Cherry St., West Newton 65, Mass.

Use ACTION Card, opposite page 64. Circle No. 124

## **Cut-off machine head offered as separate package**

The work head and belt guard assembly of the Delta cut-off machine are now being offered as a separate package for use in building special-purpose machines. It is useful in cutting to length moldings as they emerge from forming machinery and similar operations.

The head features ball bearing assembly, 2-11/16" three-belt arbor pulley, 3 1/2" and 5" wheel flanges, feed

handle, motor mounting plate, pivot shaft with Timken roller bearings, and adjustable torsion spring.

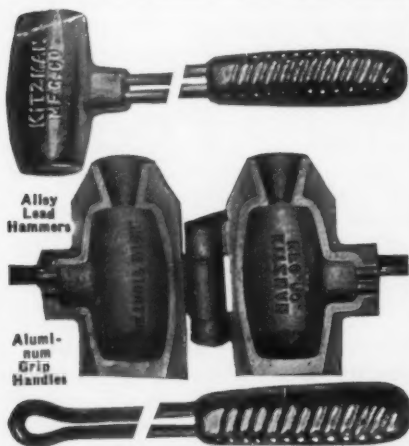
It can cut wood up to 2 by 6 inches, nonferrous tubing with a maximum o.d. of 2 inches, nonferrous solids up to 1-½-inches thick. Using an abrasive wheel, it can cut 1-¼-inch ferrous tubing with a 5/32-inch wall and ferrous solid stock up to ¾ inches in diameter.

Arbor speed with a 1725 rpm motor and 6-inch motor pulley is 4000 rpm—with a 3-inch motor pulley, 2000 rpm. With a 10-inch blade, cutting speed is 10,500 fpm, or 5250 fpm at the lower arbor speed. Delta Power Tool Div., Rockwell Mfg. Co., 449 N. Lexington Ave., Pittsburgh 8, Pa.

Use ACTION Card, opposite page 64. Circle No. 125

### Broaching machine

The Bond-Aire broaching machine for small work performs in four major areas: internal push broaching; surface



Alloy  
Lead  
Hammers

Alumi-  
num  
Grip  
Handles

Hinged Hammer Moulds

1, 2½ and 3 lb. sizes—order your alloy lead hammer requirements from your machine tool supply house

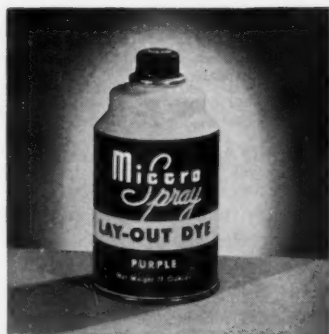
or direct from:

**KITZMAN MFG. CO.**

15061 Hartwell Ave. Detroit 27, Mich.

Circle No. 463 on Card, Opposite Page 65

November, 1956



**Micro  
Spray**

**LAY-OUT DYE**

(Purple)

MICCRO Lay-Out Dye, long the leader in its field, now available in an AEROSOL package for SPRAYING.

All the advantages—instant drying; clear, sharp lines—*plus* easy-to-use, dependable, efficient MICCRO Spray container.

Regular MICCRO Supreme Lay-Out and Identification Dye in seven distinctive colors available as always in brush-in-cap and conventional containers.

**Write for circular  
on company letterhead**

**MICHIGAN CHROME  
& CHEMICAL COMPANY**

8615 Grinnell Ave., Detroit 13, Mich.

Circle No. 464 on Card, Opposite Page 65

**LASSY****MASTER  
V-BLOCK**

## ANGLE PLATES

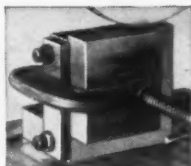
**Proven Time Savers!**

**A Master tool of versatility for every day use in . . . inspection and machining operations.**

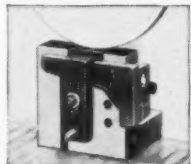
This Master V-Block Angle Plate is an improved new design. Saves hours of setup time. Assures precise work accuracy. Requires less skill.



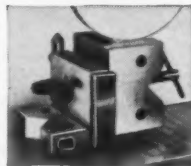
Side Gage automatically squares work precisely and without removing angle plate from chuck. Repetitive accuracy maintained.



Adjustable parallel holds the smallest work for position and clamping with ease and accuracy.



LASSY MASTER Angle Plate also provides a master setup for regrinding of worn or inaccurate Angle Plates.



**The LASSY MASTER Angle Plate is an indispensable tool precisely accurate and dependable.**

WRITE FOR ILLUSTRATED LITERATURE

**LASSY TOOL  
COMPANY**

PLAINVILLE, CONN.

Circle No. 465 on Card, Opposite Page 65

broaching; slotting; hole burnishing. It has an output rate as high as 1300 pieces per hour in a variety of ferrous and non-ferrous metals, including stainless, high carbon, and low-alloy steels, brass, bronze, aluminum, and plastics. Giving a micro-finish to No. 10 rms, this air-operated machine in many cases eliminates deburring, grinding, and tumbling. The F. Hallock Co., Dept. DR, 116 Main St., Derby, Conn.

Use ACTION Card, opposite page 64. Circle No. 126

### Machine automatically locates, drills holes

Direct numerical input by means of dials or punched tape controls the Hillyer Model LD-24 automatic locating and drilling machine. This heavy duty machine handles work up to 24" in width and any reasonable length. The 1 hp automatic drill head will drill up to 1/2" or larger holes in templates, panels, printed circuits, castings, etc.

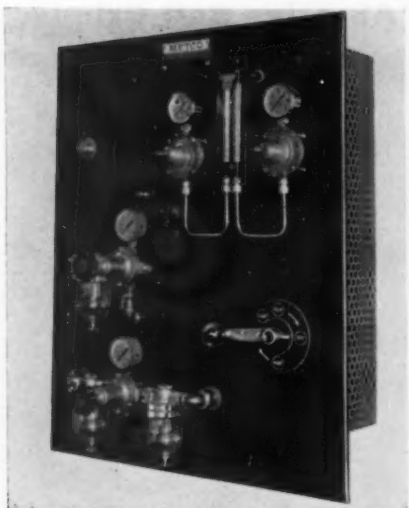
The operator sets actual length and width dimensions in increments of .001" on direct numerical dials and presses direction controls to set the machine in motion. The rest is completely automatic. Simultaneously, the drilling unit moves crosswise to the selected width dimension, while the table moves the work piece to the length dimension. As soon as the selected position is located, the drill feed is automatically actuated. If desired, the drilling operation can be controlled manually. Hillyer Instrument Co., Inc., Dept. 86, 54 Lafayette St., New York 13, N.Y.

Use ACTION Card, opposite page 64. Circle No. 127

### Metallizing control panel opens gas valves, lights gun

With the Metco Type CP control panel you can set up for a completely controlled metallizing production run. All gas, oxygen and air controls and wire feed are set just once. You stop and start the spraying operations with a turn of the control handle. Without disturbing any adjustments, you can light, run, stop and relight as often as





your production run requires. Metallizing Engineering Co., Inc., Dept. MG, Westbury, N. Y.

Use ACTION Card, opposite page 64. Circle No. 128

*Peaslee*  
**DOWELS, PINS,  
SHAFTS, ETC.**

Specializing in Stainless Steel  
Standard and Made to Order Precision Parts  
Send Your Blueprints for Prompt Quotations

**PEASLEE METAL PRODUCTS CO.**  
470 Tolland St.  
EAST HARTFORD, CONN.

Circle No. 466 on Card, Opposite Page 65

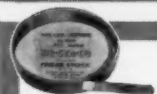
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## SPECIFY TOP QUALITY



### ARBOR SPACERS

**SHIMS and SPACING COLLARS** • Arbor Spacers and Shims in 20 sizes and thicknesses from .001" to .125". Arbor Spacers furnished with standard keyway; Shims, with no keyway. Also Spacing Collars in numerous popular diameters, and in thicknesses from 1/8" to 3". Hardened and ground; edges chamfered. Furnished with standard keyway.

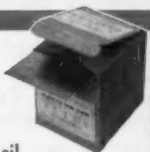


### FEELER STOCK •

Made from tempered stock, rolled to close tolerances, 1/2" x 25' coils packaged in transparent plastic boxes, except above .020". Strips 1/2" x 12", in cellophane. 27 thicknesses. All thicknesses from .001" to .032". (For use in precision fitting, checking clearances, inspection and production work.)

### SHIM STOCK •

Steel or brass. Selected from material rolled to precision limits, free from burrs, and protected by oil coating. Coils packed in carton for easy dispensing and protection. 15 thicknesses, .001" to .032". Sheets 6" x 12"; coils 6" x 120". Available also in two assortment packages—12 thicknesses, .001" to .015", and 15 thicknesses, .001" to .032".



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Illustrated Brochure  
and Price List!



## DETROIT STAMPING CO.

347 MIDLAND AVE. • DETROIT 3, MICH.  
Circle No. 467 on Card, Opposite Page 65



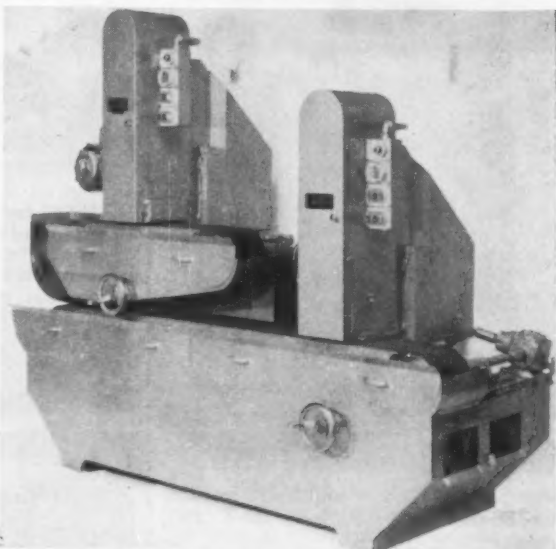
## Two-Side Conveyor-Type Abrasive Belt Grinder

For high-speed precision surfacing both sides of flat parts this two-level wet-or-dry belt grinder features a dual conveyor arrangement. Parts are carried under the upper grinding head on a 10½"x107 abrasive conveyor belt and automatically turned over in a gravity feed hopper. The lower conveyor belt, 10½" x 206, carries them under the second head for grinding the reverse side.

Grinder is particularly adaptable to automatic production lines. Parts can be conveyorized for presentation to the machine's upper conveyor belt, automatically ejected from lower conveyor belt, and carried to next operation. Hopper device can be sectionalized for smaller parts.

Speed of conveyor belts with ½ hp conveyor drive is 2 to 25 feet per minute, with higher speed ranges available for special applications. Engelberg Huller Co., Dept. RS, 831 W. Fayette St., Syracuse 4, N.Y.

Use ACTION Card, opposite page 64. Circle No. 129



New 1956 Model "BB"

### RADIUS DRESSER

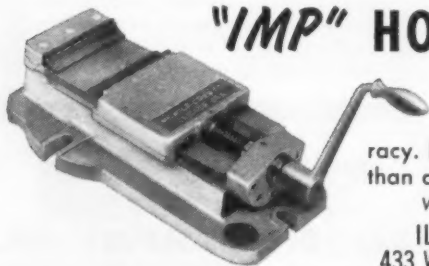
Outperforms them all

Cut production time without sacrificing accuracy! Easy to set, easy to see, eliminates necessity of guard removal. Somerset Radius Dresser turns "tricky" jobs into routine operations. Write for free illustrated folder.

At new low price \$124.50  
with diamond

**SOMERSET TOOL CO.** 244 Virginia St.  
Hillside, N. J.

Circle No. 468 on Card, Opposite Page 65



## "IMP" HOLD-DOWN VISES

WILL Repeatedly

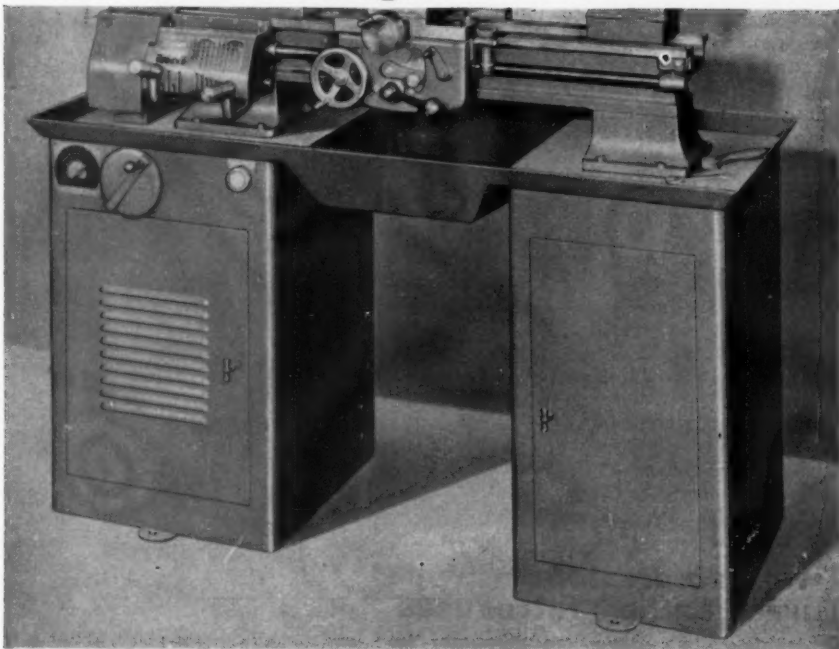
Chuck work with gage block accuracy. No hammering or fussing. 80% faster than any other holding device.

Write today for 8 page IMP VISE brochure

**ILLINOIS METAL PRODUCTS**  
433 W. Superior Street, Chicago 10, Illinois

Circle No. 469 on Card, Opposite Page 65

## Lathe Cabinets Changed



Two new styles of cabinets are available for the 12", 11" and 10" Logan lathes. In one, a single door opens to reveal three spacious storage compartments or shelves inside the right pedestal. The second style provides three separate pull-out drawers with individual locks. Both feature a capacious chip pan.

The rigid, compact construction of these bases saves floor space while providing sturdy and steady mounting for the heavily proportioned lathes. Logan Eng. Co., Dept. RB, 4901 W. Lawrence Ave., Chicago 30, Ill.

Use ACTION Card, opposite page 64. Circle No. 130



### DYKEM STEEL BLUE

Stops Losses

making Dies and  
Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead  
**THE DYKEM COMPANY**  
2301G North 11th St. • St. Louis 6, Mo.

Circle No. 470 on Card, Opposite Page 65

## Mechanical Convection Ovens

A constant air weight circulation at all temperatures, for greater heating efficiency, is a feature of Blue M's Con-Wate Ultra-Temp horizontal airflow mechanical convection oven with a temperature range to 1200°F.

Automatic control damper progressively and automatically permits more air into the working chamber as the temperature rises. This compensating feature for loss of air weight is due to an unusual blower system and damper.

Blue M Electric Co., Dept. HS, 138th & Chatham St., Blue Island, Ill.

Use ACTION Card, opposite page 64. Circle No. 153



## Two Universal Ram Type Turret Lathes Introduced

Simplified operating controls and faster speed changing through the use of a new hydraulic headstock are among important design features of the new No. 4 and No. 5 universal ram type turret lathes introduced by the Warner & Swasey Co., Dept. RH, Cleveland, O. Both machines are adaptable to existing tooling and can be used with the latest special turret lathe attachments.

Operator's controls are zoned, with

one lever at the headstock actuating all speed changes, another lever providing forward, reverse, brake or free spindle operation. A headstock mounted direct-reading speed preselector, calibrated in rpm's, surface speeds, and work diameters, makes possible rapid selection and use of the proper spindle speeds for every cut.

All-hydraulic headstock eliminates gear shifting by means of constant mesh

Our Large, planned stocks of



**T. H. LEWTHWAITE MACHINE CO.**

### Punches & Dies

mean savings for you.

For years we have been following a systematic plan of increasing our stocks of standard punches and dies that benefits you two ways:

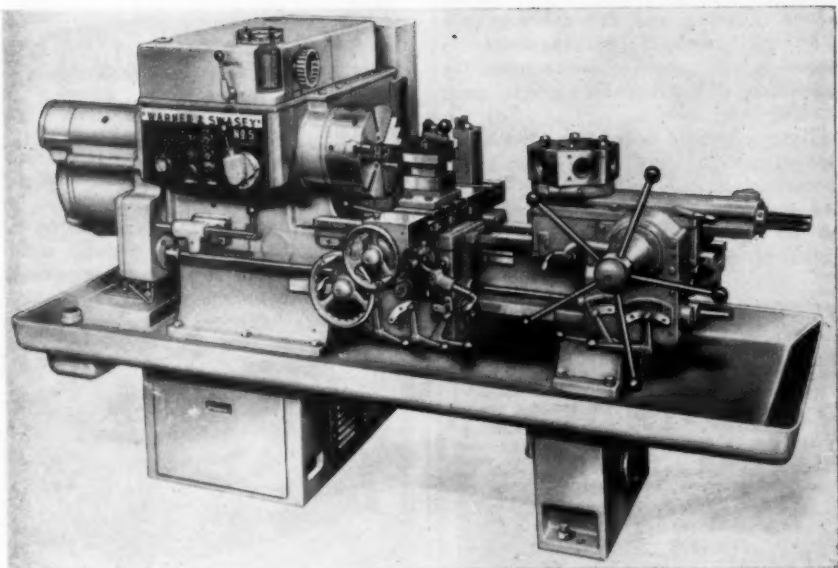
- (1) The punches and dies you need are **READY** and waiting **WHEN YOU NEED THEM**.
- (2) Because standards are made in large quantities, **PRICES ARE SURPRISINGLY LOW**—quality of the highest.

68 years of experience goes into every Lewthwaite tool—and it shows!

CATALOG SHEETS ON REQUEST.

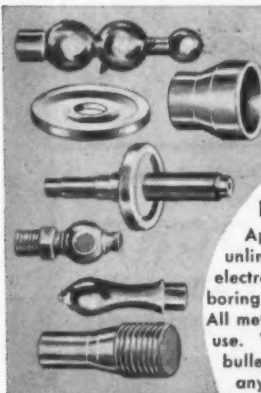
312 East 47th St., New York 17, N.Y.

Circle No. 471 on Card, Opposite Page 65



warner & swasey No. 5 Turret Lathe

**Amazing tool does  
CONTOUR TRACING on BORING MILLS  
and PRECISION DUPLICATING  
on Lathes or Planers**

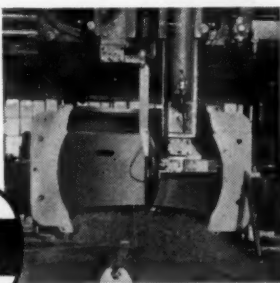


**FULL COST  
LESS THAN \$1000**

Application and uses are practically unlimited. No complicated hydraulic or electronic controls. Does facing, grinding, boring, steps, threading—unlimited radii. All metals. Thousands in long, satisfactory use. Write for illustrated engineering bulletins and experienced assistance on any duplicating problem—anywhere!

★ Some territory still available for qualified representatives.

Circle No. 472 on Card, Opposite Page 65



Tolerance of  $\pm .002$  is maintained by Lehigh TRACER-TOOL in boring this huge water-cooled bearing housing and machining the inner bearing. TRACER-TOOL can be removed from boring mill and be in operation on a lathe or planer in less than one hour.

**FRED H. SCHONBERGER, Inc.**  
P. O. Box 233  
Nazareth, Penna.  
National Distributors

helical gearing and direct-acting hydraulic clutches. It provides instantaneous spindle speed changes upon the movement of the machine's single speed control lever.

Twelve spindle speeds, or 24 unduplicated spindle speeds with a two-speed motor, in a 62.2 to 1 over-all range, are standard on both models. Speeds on the No. 4 are 30-1866 rpm, with a 15/7½ hp drive motor, while the No. 5

provides 25-1556 rpm, with a 20/10 hp drive motor.

Use ACTION Card, opposite page 64. Circle No. 131

## Lapped granite surface plates

Seizure of gage blocks and checking fixtures, which has occasionally occurred when using granite surface plates, is claimed to have been eliminated by a lapping method which provides a continuous bearing surface interspersed with micronic valleys. These minute reliefs afford sufficient air pocket relief



between bearing surfaces to prevent seizure of instruments. The sub-divisions of the grain pattern are so small as to be invisible to the naked eye.

Plates are available in either two ledge or four ledge styles and are furnished down to fifty millionths overall accuracy. For a free souvenir desk weight—an exact replica of the Microflat black granite surface plates—write Collins Microflat Co., Dept. KE, 2326 E. 8th St., Los Angeles 21, Calif.

Use ACTION Card, opposite page 64. Circle No. 132

# TROYKE

## ROTO-INDEXER

### Indexing

Rapid

•

Positive

•

Accurate



### CHUCK OR T-SLOTTED INDEXING TABLES - FOUR MODELS

Hand operated. Unique patented block out arrangement. Can be used in vertical or horizontal position.

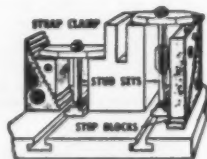
WRITE FOR CATALOG NO. 20



**TROYKE MFG. CO.**

11290 Orchard Street  
Cincinnati 41 (Sharonville), Ohio

Circle No. 473 on Card, Opposite Page 65



## SURE GRIP STEP BLOCKS

Clamping tools of all types

Write for free tracing templates

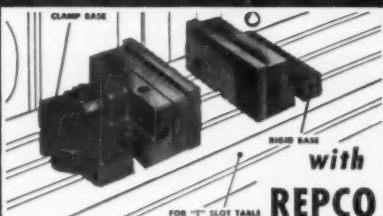
**TIETZMANN TOOL CORP.**

Dept. C. T.

Englewood, Ohio

Circle No. 474 on Card, Opposite Page 65

## INCREASE AVAILABLE CLAMPING CAPACITY



### 2-Piece Machine Vise Set

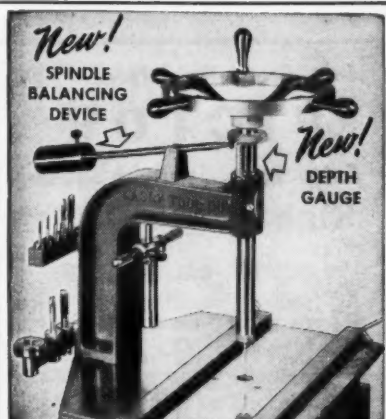
Cuts costs . . . supplements use of one-piece vises. Machined for precision accuracy.

- Two Sizes — 6" and 8" widths. Depth  $2\frac{1}{2}$ ". T-Slot center distances:  $2\frac{1}{4}$ " -  $2\frac{3}{4}$ ",  $2\frac{3}{4}$ " -  $3\frac{1}{4}$ ".
- Greater Versatility — useable as general purpose vise, as an angle block, as separate clamping device.

Write for Bulletin 100 - Dealer Inquiries Invited

**ROCKFORD ENGINEERED PRODUCTS CO.**  
2324 23rd Avenue • Rockford, Illinois

Circle No. 475 on Card, Opposite Page 65



## LASSY TAPPERS

New exclusive features and top quality make Lassy Tappers outstandingly the finest available, for the tool room—small lot production—and the problem jobs. A low priced investment that soon pays for itself.

Write for illustrated circular showing 3 models, and also Universal Tap and Die Guide.

**LASSY TOOL CO.** Plainville, Conn.

Circle No. 476 on Card, Opposite Page 65

## the new LOW PRICED OMEGA JIG BORER with the Giant Sized Table 20" X 32" WORKING AREA

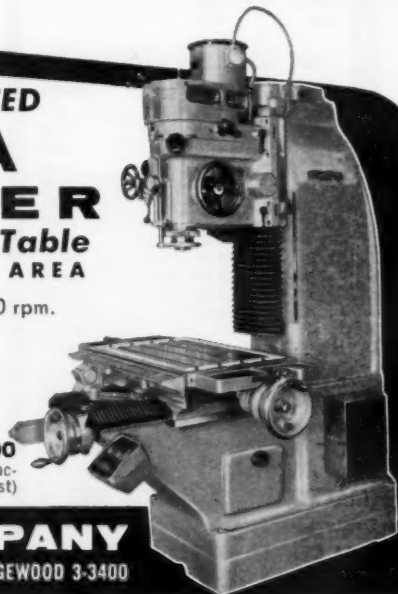
- 16 Spindle speeds from 35-1500 rpm.
- Hardened and ground screws
- Trays for dial indicators and measuring rods, motor and controls, included.

**PRICE fob, New York \$8300.00**

Optical measuring system with overall accuracy of .0002" (available at additional cost)

## AMITOOOL COMPANY

629 MAIN STREET, WESTBURY, L.I., N.Y., EDGEWOOD 3-3400





Great Buys from  
**VICTOR**  
 Extra Long, Straight Shank  
 High Speed Drills

**12" OA, 9" FLUTE**



SIZE	PRICE	SIZE	PRICE
1/8	1.65	27/64	3.30
9/64	1.75	7/16	3.30
5/32	1.75	29/64	3.60
11/64	1.85	15/32	3.60
3/16	1.85	31/64	3.60
13/64	1.95	1/2	3.60
7/32	1.95	33/64	4.20
15/64	2.05	17/32	4.20
1/4	2.05	35/64	4.50
17/64	2.15	9/16	4.50
9/32	2.15	37/64	4.75
19/64	2.25	19/32	4.75
5/16	2.25	39/64	5.00
21/64	2.50	5/8	5.00
11/32	2.50	21/32	5.40
23/64	2.75	11/16	5.80
25/64	3.05	23/32	6.25
13/32	3.05	3/4	6.75
3/8	2.75		

**18" OA, 13 1/2"-14" FLUTE**

SIZE	PRICE	SIZE	PRICE
3/16	4.00	9/16	8.75
7/32	4.10	19/32	9.50
1/4	4.10	5/8	10.00
9/32	4.75	41/64	11.00
5/16	4.75	21/32	11.00
11/32	5.25	43/64	12.00
3/8	5.25	11/16	12.00
13/32	6.00	45/64	13.00
7/16	6.00	23/32	13.00
15/32	6.50	47/64	14.00
1/2	7.00	3/4	14.00
17/32	8.50		

**Order Today**

**IMMEDIATE DELIVERY!**

**VICTOR**  
 MACHINERY EXCHANGE INC.  
 Dealers in Tool Room Equipment  
 251 CENTRE STREET, DEPT. B  
 Tel: CAnal 6-5575, New York 13, N.Y.

Circle No. 478 on Card, Opposite Page 65

**Drilling machine performs three operations**

This bench-type drilling machine, by means of two automatic drilling units, one with a 2-spindle head, performs two drilling and one counterboring operation automatically with one loading. The operator loads and clamps the part in a simple fixture, then depresses the start-cycle switch, whereupon the left-hand drilling unit automatically feeds forward and drills two holes. The withdrawal of the spindles causes the right-hand unit to feed in automatically to counterbore one of the two holes previously drilled.

With this simple setup, the three operations are performed automatically at an output rate in excess of 300 pieces per hour. By making slight changes in mounting and fixtures, the machine is readily adaptable to drilling a variety of parts. Govro-Nelson Co., Dept. JS, 1933 Antoinette, Detroit 8, Mich.

U.e ACTION Card, opposite page 64, Circle No. 133

**SAVE**  
**UP TO**  
**80%**

**MOVE YOUR HEAVY**  
**MACHINERY**  
 with your own  
**men**



**and**  
**MIGHTY MOVER**  
**dollies**

Fits any machine base. Load capacity 100,000 lbs. 360° directional control. No skids, cable or pipe needed. Safer, faster. Ask for literature and names of current users for proof.

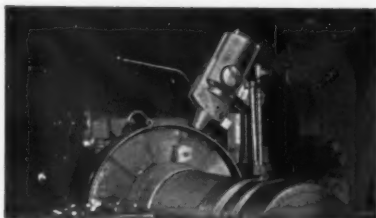
**MIGHTY MOVER CO.**  
 1279 South Gilpin Denver 10, Colo.

Circle No. 479 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK



# INCREASE PRODUCTION...



Above is shown a 6M Fen Automatic Wrench operating a 28" heavy duty chuck.

## ELIMINATE "WRENCH WRESTLING"

You can put the advantages of the Fen Automatic Wrenches to your work right in your own shop on machines already in operation, or specify them on your new standard or automatic machines.

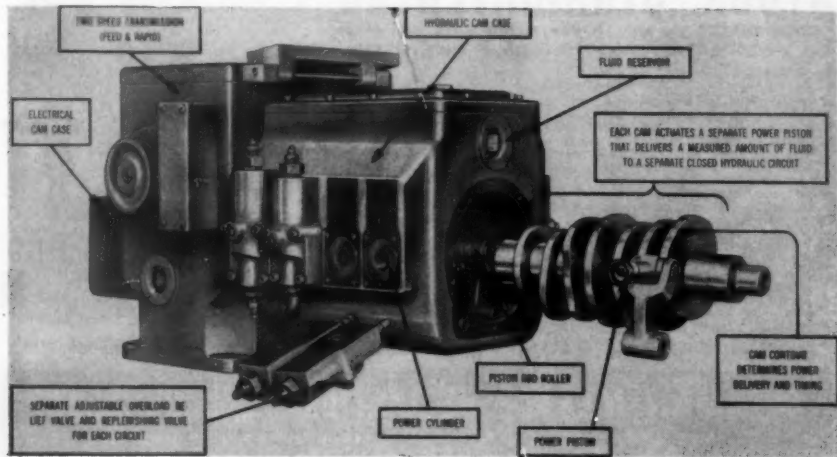
For detailed information regarding the application of the Fen Automatic Wrench to your machines, phone, wire or write.

**THE FEN  
MACHINE COMPANY**  
28914 Lakeland Blvd.  
Wickliffe, Ohio

Circle No. 480 on Card, Opposite Page 65

## Multiple-Circuit Hydraulic Power, Sequence Control

The Thompson Hydra-Cam consists of a series of hydraulic power cylinders, each connected to an individual closed hydraulic circuit. Each cylinder is



equipped with a power piston driven by one of a series of cams mounted on a common shaft. The cam shaft is powered through a two-speed transmission.

By varying the characteristics of the individual cams, any timing and sequence or overlapping of motions is obtainable, as well as any length of stroke within power cylinder limitations. Feeds, chucking, clamping, loading, unloading, gaging are some of the functions available for boring, broaching, grinding, milling, drilling, welding assembly and other machines which combine two or more operations in timed relationship. Each function has its own closed hydraulic circuit with overload protection. Any type motion can be produced such as constant velocity or harmonic.

Cycles can be as fast as one per second. The two-speed drive provides for both the work and idle cycles. Feed

rates are unaffected by changes in fluid viscosity.

The hydraulic fluid is always under pressure to exclude air. The return stroke of each power piston is actuated by energy stored in an accumulator during the power stroke, so the piston rod roller is always in contact with its cam. Earl A. Thompson Mfg. Co., Dept. JS, 1300 Hilton Rd., Ferndale, Mich.

Use ACTION Card, opposite page 64. Circle No. 135

## Tool holders

Two additions to the Aloris line of tool holders for the manufacturer's quick change tool post are a threading holder and a combination holder for knurling, facing & turning. The threading holder is supplied with one 60° high-speed threading blade for standard thread cutting. Blades for acme and square thread cutting are also available.

When the user wishes to change a tool, he flips the handle on the tool post, slides out the tool holder, then slips in

## HOW TO STOP HEADACHES IN THE PRESS ROOM AND

SAVE AT LEAST 10% ON HAND FED JOBS BY USING COIL INSTEAD OF STRIP MATERIAL

## STOCK STRAIGHTENERS

ORDER DIRECT on our 10 day money back guarantee  
The ONLY low cost stock straightener with all these features:

- CAPACITIES—**  
2" wide: .010 to .065 in steel, to .003 in soft material.  
4" wide: .010 to .048 in steel, to .065 in soft material.
- MACHINE DETAILS**
1. Built in Stock Oiler with easily replaceable felts, this cleans and oils the material in one operation.
  2. Has seven hardened and ground rollers, five for straightening and two for feeding.
  3. All lower straightening rollers and the feed rollers are gear driven, thus cuts feeding pressure and protects pre-painted and pre-plated materials.
  4. PULLS material through the straightening rollers. WILL NOT BUCKLE THIN MATERIAL, has been used on Inconel, Stainless Steel, Platinum, Phosphor Bronze, and Beryllium Copper.
  5. The pressure rollers have adjustable stops, this can save thirty to sixty minutes a day.
  6. Has Ball-Bearing Guides at front and back.
  7. All gears and moving parts are protected by guards to keep dirt and fingers out.

CAN BE SUPPLIED IN MANY MODELS, motor drive, etc., write for information.



## SPERMAN METAL SPECIALTIES

Manufacturer of "MIGHTY MIDGET" Radius and Angle Dressers

2197 East 21st Street  
Brooklyn 29, New York

Circle No. 481 on Card, Opposite Page 65

## INDEXING MACHINERY — CAMS — GENEVA GEARS — TURNTABLES



**MFG. REP. WANTED**  
**DR. CHARLES EISLER ME. FOUNDER**

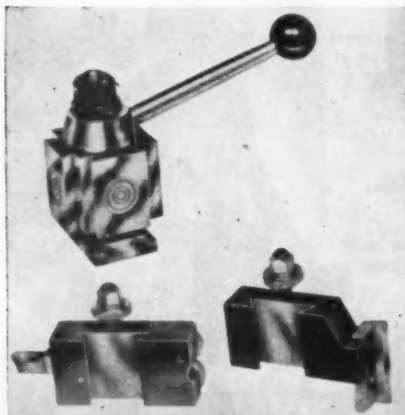
**ASK FOR CATALOG No. 88-57**  
**CHARLES EISLER, JR. PRES.**

**EISLER ENGINEERING CO., INC.**

**762 SOUTH 13th STREET**

**NEWARK 3, NEW JERSEY**

Circle No. 482 on Card, Opposite Page 65



the next tool. Flip the handle back and the second tool is instantly aligned in the same preset position. Aloris Tool Co., Inc., Dept. DR, 131-37 Sanford Ave., Flushing 55, N.Y.

Use ACTION Card, opposite page 64, Circle No. 136

### Refrigerated mist cools tool, not chips

The discovery that the refrigeration principle could be utilized in metal-working is now making many impossible machining operations practical,



and commonplace jobs easier and faster.

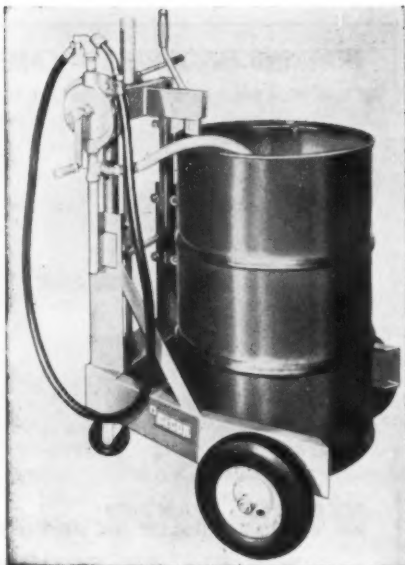
Refrigerated mist applied by the Aetna Mistic Mist coolant generator cools the actual cutting edge of the tool. Refrigerated mist cooling is claimed to increase production efficiency, cut tool costs and produce finer finishes. Aetna Mfg. Co., Dept. RB, 188 So. York St., Bensenville, Ill.

Use ACTION Card, opposite page 64. Circle No. 137

### Drum dispenser

Effortless handling of drums weighing up to 1000 lb. and transfer of oil and coolants directly from drum are features of the CeCOR drum dispenser Model 76.

Adjustable clamp grips chime of standard 55 and 30 gallon open or closed end drums or drums with fully removable head for transporting in an upright position. Positive locking action permits one man handling of open drums of liquid with no danger of spillage. Hy-



## Adjustable MULTI-DRILL for Production Drilling

3" DRILLING AREA  
AVAILABLE WITH 2 TO 8 SPINDLES

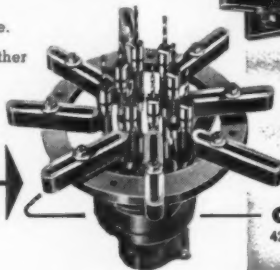
- Designed for accurate, high speed production drilling
- RUGGED CONSTRUCTION
- Quick, easy adjustments to **any** hole pattern on or within a 9" circle;  $\frac{1}{2}$ " minimum center distances; Drill sizes  $\frac{1}{16}$ " to  $\frac{3}{8}$ "
- Special adaptations available.

MULTI-DRILLS are made in other sizes and models.

Write for details and name of your nearest Distributor.

• Locator arms are designed for fast, easy adjustment

Dependable Performance...  
proven by industry



Circle No. 483 on Card, Opposite Page 65

To Save You  
**HOURS** of  
Detailing  
Time...



## A New Extended Range of O. D. Symbol Listings For **ECONOMY** Bushings

ECONOMY'S new "Dimensional Data Sheet No. 7-A" includes an *extended range* of Standard Drill Jig Bushings by symbol listings up to 5" O.D. by 5" in length.

This eliminates all need for detailing. You specify by symbol and hole size only.

Ask for "Dimensional Data Sheet No. 7-A" TODAY!

**ECONOMY TOOL & MACHINE CO.** 1829 SOUTH 68TH STREET  
MILWAUKEE 14, WISCONSIN

Circle No. 484 on Card, Opposite Page 65

draulic pump and ram lifts loads to convenient height for transporting. Coolant Equipment Corp., Dept. RB, Verona, Wis.

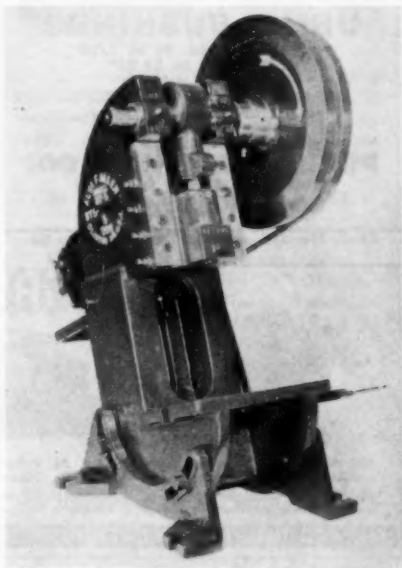
Use ACTION Card, opposite page 64. Circle No. 138

### Heavy-duty 5-ton punch press

Model B-5 5-ton punch press will perform up to 280 operations per minute on continuous punching, shearing, forming, riveting, blanking, cutting, drawing. Heavy 65 lb. flywheel assures ample power for heavy-duty operations.

The upper connecting rod—ram assembly is unitized for alignment in conjunction with the heavy crankshaft and precision machined die bed. Ram can be easily adjusted for die setting with standard wrenches.

The new synchronized, single pin, repeat or non-repeat clutch is of simplified construction, containing fewer



operating parts. All contact parts are heat-treated. Standard stroke is 1 1/4" with 1/4" to 2" strokes also available. Alva Allen Industries, Dept. HS, Clinton, Mo.

Use ACTION Card, opposite page 64. Circle No. 139

### Combined linear, angular movement spots drill head over work

Positioning the drill head without disturbing the workpiece is permitted in this radial drilling machine by a combination of linear and angular ram movements.

Mounting the ram on roller bearings provides sensitive linear positioning of the drill head. The tube column raises vertically and also rotates around its axis 360°, providing both vertical and angular positioning.

The 360° ram rotation permits use of two work stations, one on the adjustable table in front of the machine



and the second on the fixed platform at the rear of the machine. Large workpieces are moved on to the rear platform of the machine and smaller workpieces on the 20" x 28" table.

Drill head on the ram can be brought up to within 5" of column or moved out to drill to center of 52" circle. Vertical movement of column permits a maximum of 53" from spindle nose to working surface, 3 1/2" minimum.

Maximum power is transmitted through geared drive, allowing use of drills up to 1 1/4" in cast iron. Any of eight spindle speeds, ranging from 104 to 1200 rpm, can be selected instantly while machine is running by shift levers which actuate drive clutches. Gears are in

## MINIATURE DRILL BUSHINGS

Hole Sizes—No. 80 to 3/32"

O.D. 3/32" to 13/64"

Lengths 1/4" to 3/4"

.0002 Tolerance on I.D.,

O.D., and Concentricity

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### PREBCO BUSHING CO.

14702 East Arrow Highway  
Baldwin Park, California

Circle No. 483 on Card, Opposite Page 65

## PALMGREN

Rotary and Indexing Tables  
for Milling Machines, Drill Presses, Grinders



No. 84 Tilting Indexing and Rotary Table—\$139.50



No. 86 Rotary and Indexing Table—\$69.95



No. 83 Rotary Table for vertical milling—\$79.95

64 different models and types of Palmgren vises, rotary tables, milling attachments and other machine tool accessories—the most complete line of vises and tables available anywhere. Write for catalog 204

CHICAGO TOOL AND ENGINEERING CO., 8384 South Chicago Avenue, Chicago 17, Illinois

Circle No. 486 on Card, Opposite Page 65



constant mesh, eliminating gear damage when changing speeds.

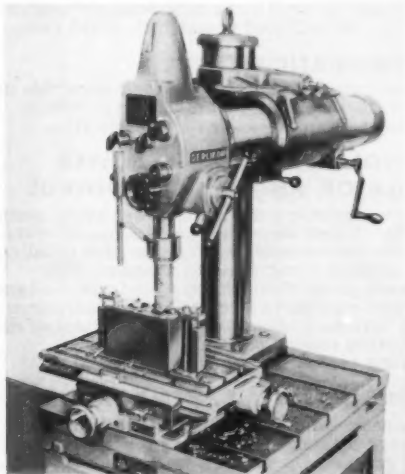
The No. 4 Morse taper spindle travels 6". A smaller machine, with 1 1/4" drilling capacity, No. 3 Morse taper and 5" spindle travel, is also available from the manufacturer, I O. Johansson Co., 7248 St. Louis Ave., Skokie, Ill.

Use ACTION Card, opposite page 64. Circle No. 140

### All-angle borer

Combining a radial swivelling arm with a freely swivelling head, the Oerlikon UB2 borer is capable of tackling jobs in awkward positions. Machine performs a wide variety of general workshop operations such as drilling, milling, countersinking, tapping, counterboring, reaming. The boring head can be canted to any angle (360°) and latched into the vertical and horizontal positions.

The range of speeds (30 to 3070 rpm), three power feeds, and a compound table for coordinate location make



borer suitable for tool room work. Olkon Research Corp., Dept. DR, 630 Fifth Ave., New York 20.

Use ACTION Card, opposite page 64. Circle No. 141

## DEPENDABLE ACCURACY



INSPECTION TOOLS made of MEEHANITE METAL are designed to fill your various Inspection and Checking needs. Sturdily constructed to give you reliable, accurate service.

Surface Plates — Box Parallels  
Slotted Angle Plates  
Universal Right Angles  
Flat Parallels — Lapping Plates  
Toolmakers' Knees — "V" Blocks  
Straight Edges (Bridge Type)  
Straight Edges (Leveling Type)  
Measuring Irons  
Masterangle Plates  
Angle Attachments  
Surface Plates Rescraped

Send for Bulletin

## ACME TOOL CO.

71 W. Broadway New York 7, N.Y.

Circle No. 487 on Card, Opposite Page 65

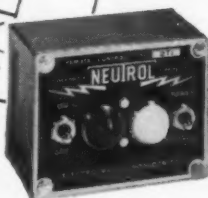


# electrical controls

## for Full Magnetic Chuck performance



**A**  
ELIMINATE  
STRONG ARM  
METHODS



**B**  
DEPENDABLE SOURCE  
OF DIRECT CURRENT



**C**  
PARALLEL  
GRINDING  
WITHOUT  
SHIMMING



**A** **ELECTRO-MAGNETIC  
CHUCK CONTROL**

Releases and demagnetizes work pieces simultaneously. No time lost. No damage to work or chuck face. Protects chuck from voltage surges. Speeds production. Chuck capacities: 50 to 15,000 Watts . . . 60 to 20,000 square inch chuck area.

**B** **ELECTRO-MATIC RECTIFIER**

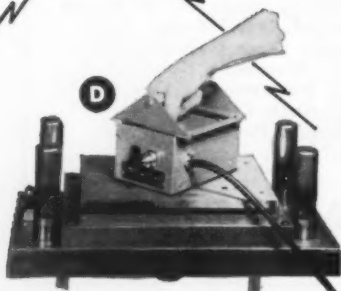
Power conversion Unit, proved for dependable use with Magnetic chucks and other direct current equipment, from 50 Watts to 40 Kilowatts.

**C** **NEUTROLATOR HOLDING POWER  
REGULATOR AND CHUCK CONTROL**

Provides regulation of holding power which permits grinding without shimming, to closer parallelism than ever before possible. In production grinding where holding power must be the same with each work piece, Neutrolator reproduces the same tension on successive pieces without readjustment. Where various tensions are required, a simple dial or push-button control provides regulation of holding power.

**D** **ELECTRO-MATIC A.C. DEMAGNETIZER**

Demagnetizes dies, punches, cutters, tools that have been magnetized from any source. Works by simple contact. Operates on standard A.C. voltage. Will not overheat through constant use. A size for every purpose.



*The Best Is None Too Good For  
Your Cutting Tools And Dies*

Circle No. 535 on Card, Opposite Page 65

**ELECTRO-MATIC  
PRODUCTS  
CO.**

2235-37 N. Knox Ave.

Chicago 39, Ill. (U.S.A.)

Telephone: BElmont 5-4010

**SID TOOL**  
COMPANY, INC.

Your headquarters for Special  
Taps and Drills now stocks...

**HIGH  
SPEED**

**SPECIAL SIZE**

**MILLING  
CUTTERS**



### SIDE MILLING CUTTERS

Precision made in U.S.A.

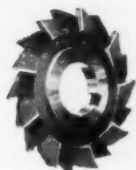
**IN STOCK FOR  
IMMEDIATE DELIVERY!**

DIAM- ETER	WIDTH OF FACE	SIZE OF HOLE	PRICE EACH
4	7/32	I	11.40
4	9/32	I	13.35
4	5/16	I	13.70
4	7/16	I	15.05
4	9/16	I	17.15
4	1 1/16	I	18.10
4	1 3/16	I	20.85
4	1 5/16	I	22.95
4	I	I	23.65
4	I - 1/8	I-1/4	23.75
4	I - 1/4	I-1/4	28.35
5	1/4	I	17.50
5	5/16	I	17.80
5	3/8	I	19.70
5	7/16	I	20.95
5	9/16	I	23.55
5	1 1/16	I	26.30
5	1 3/16	I	28.35
5	7/8	I-1/4	30.50
5	1 5/16	I	31.50
5	1 7/16	I	31.60
6	5/16	I	22.10
6	3/8	I	23.70
6	7/16	I	25.30
6	9/16	I	31.20
6	1 1/16	I-1/4	33.45
6	1 3/16	I-1/4	35.75
6	7/8	I	36.65
6	1 5/16	I-1/4	38.50
8	1/4	I	47.70
8	5/16	I	49.70
8	3/8	I	51.05
8	7/16	I	53.70
8	1/2	I	54.55
8	9/16	I-1/4	56.65
8	5/8	I-1/4	57.50
8	1 1/16	I-1/4	59.35
8	1 3/16	I-1/4	60.50
8	7/8	I-1/4	62.20
8	1 5/16	I-1/4	63.85
10	1/4	I-1/2	87.85
10	5/16	I-1/2	88.90
10	3/8	I-1/2	83.75
10	1/2	I-1/2	92.30
10	5/8	I-1/2	105.35
10	3/4	I-1/2	121.50
10	7/8	I-1/2	131.95
10	I	I-1/2	136.70
12	1/2	I-1/2	153.95
12	5/8	I-1/2	169.75
12	3/4	I-1/2	174.35
12	7/8	I-1/2	220.10
12	I	I-1/2	236.60

### STAGGERED TOOTH SIDE MILLING CUTTERS

Precision made in U.S.A.

**IN STOCK FOR  
IMMEDIATE  
DELIVERY!**



DIAM- ETER	WIDTH OF FACE	SIZE OF HOLE	PRICE EACH
5	1/4	I-1/4	20.95
5	5/16	I-1/4	21.85
5	3/8	I-1/4	23.20
6	5/16	I-1/4	30.80
6	7/16	I-1/4	31.85
6	9/16	I-1/4	36.70
6	1 1/16	I-1/4	40.95
6	1 3/16	I-1/4	42.15
6	1 5/16	I-1/4	44.55
8	5/16	I-1/4	63.20
8	7/16	I-1/4	66.80
8	9/16	I-1/4	70.55
8	1 1/16	I-1/2	75.65
8	1 3/16	I-1/2	79.35
8	7/8	I-1/2	83.25
8	I	I-1/2	87.35
10	1/4	I-1/2	87.80
10	5/16	I-1/2	89.10
10	3/8	I-1/2	90.15
10	7/16	I-1/2	95.70
10	1/2	I-1/2	99.75
10	9/16	I-1/2	110.85
10	5/8	I-1/2	113.10
10	3/4	I-1/2	129.35
10	7/8	I-1/2	133.30
10	I	I-1/2	139.20
12	1/2	I-1/2	160.45
12	5/8	I-1/2	170.95
12	3/4	I-1/2	181.45
12	7/8	I-1/2	221.65
12	I	I-1/2	238.95

### DEALER INQUIRIES INVITED

If you are a user of cutting tools it will pay you to be on our mailing list. We also stock special and standard sizes in slitting saws, and mills, etc. Write for circular now to Dept. B.

**SID TOOL COMPANY, INC.**

*Cutting Tool Specialists*

158 LAFAYETTE ST., NEW YORK 13, N. Y.

Telephone: BEekman 3-4270

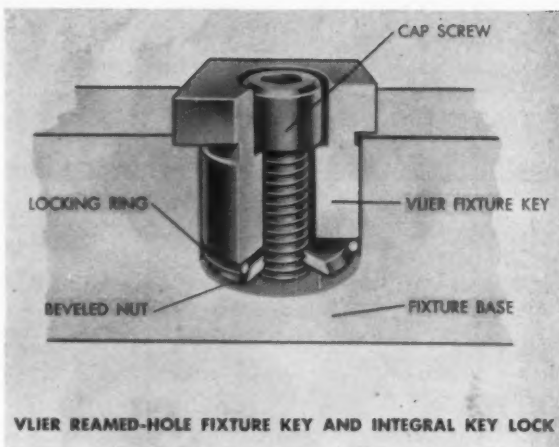
## Fixture key lock

Vlier Engineering, Inc., Dept. KE, 8900 Santa Monica Blvd., Los Angeles, has developed a simple means of securing fixture keys in the fixture base without drilling and tapping a screw hole.

The new method, now an integral part of the key, consists of a cap screw, bevel nut and expanding lock ring. After inserting the fixture key into the reamed hole and selecting the proper flats, the cap screw is tightened. This action draws the beveled nut into the lock ring, expanding it against the wall of the reamed hole. The lock ring, made of music wire for greater strength and

elasticity, locks the key in the reamed hole.

To remove the key, the cap screw is simply turned counter-clockwise. This





**CONCENTRIC** *the original,*  
**LIVE CENTERS** *patented*  
**spring loaded live center**

**FASTER SPEEDS**  
**AUTOMATIC THRUST ADJUSTMENT**

**LESS OVERHANG**  
**MEANS MORE**  
**RIGIDITY. MORE**  
**WORKING**  
**RANGE**

**GREATER LOAD CAPACITY**  
**LONGER LIFE**  
**JAM PROOF**

*Write today for  
complete information*

**CONCENTRIC TOOL CORP** 2486 Huntington Drive, San Marino, Calif

Circle No. 489 on Card, Opposite Page 65

Pat No. 2,520,473



CONVENTIONAL  
LIVE CENTER

CONCENTRIC

forces the beveled washer out of the locking ring, permitting the ring to contract. The key is then lifted out as an integral unit. The bevel nut is hardened against wear. The cap screw is staked on the inside end to maintain the assembly.

Use ACTION Card, opposite page 64. Circle No. 144

## French engraving machine

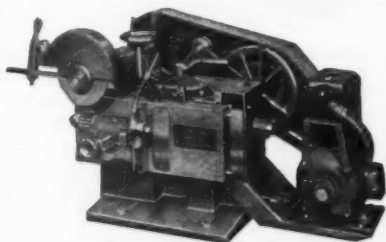
Scripta Model SR-3D, a three dimensional pantographic machine, is designed to do engravings in relief or intaglio, as well as to reproduce die-casting moulds and embossing punches. The stylus traces the master and produces corresponding movements, at a reduced scale, of the rotating engraving cutter. Ratios reduction on the pantograph are from 2:1 to 6:1 enabling 23 different dimensions to be obtained from one guide. The maximum height of work accommodated under the panto-



graph is 5.3"; with an extra-long column, this is increased to over 16". The surface covered at one setting with the pantograph set for a 2:1 ratio is about 15 3/4" x 9 3/4". Geo. T. Scherr Co., Inc., 200 Lafayette St., New York.

Use ACTION Card, opposite page 64. Circle No. 145

## AUTOMATIC METAL SAW GRINDER Cuts Costs . . . Makes Money For You!



**WARDWELL**

3807 Ridge Road  
Cleveland 9, Ohio

**Maker of Largest Line of Saw and Tool Sharpening Machines**

**Wardwell's "35 T" will sharpen  
up to 115 saws .015 thick at  
one time . . .**

This includes slitting and screw slotting saws and milling cutters. Takes saws from 2" to 5 1/2" diameter. Completely automatic. No attention is required after machine is started. These ingenious, compact and sturdy grinders are saving and making money for their owners all over the world.

**You owe it to yourself to write for  
Bulletin 35 T containing full information.**

Circle No. 490 on Card, Opposite Page 65

## Milling Machine has 12 Speeds, 12 Feeds

The overarm of the Pedersen Model VPF-2 milling machine is provided with a dovetail guide for clamping it to the column and for the clamping of the two arbor supports. It is reinforced inside by ribs. There are 12 spindle speeds, to 900 rpm.

The box shaped knee carrying the saddle and the table has for the cross movement a heavy, square guide with ground faces similar to that of the column. At the front it is supported by a standard which may be locked in position.

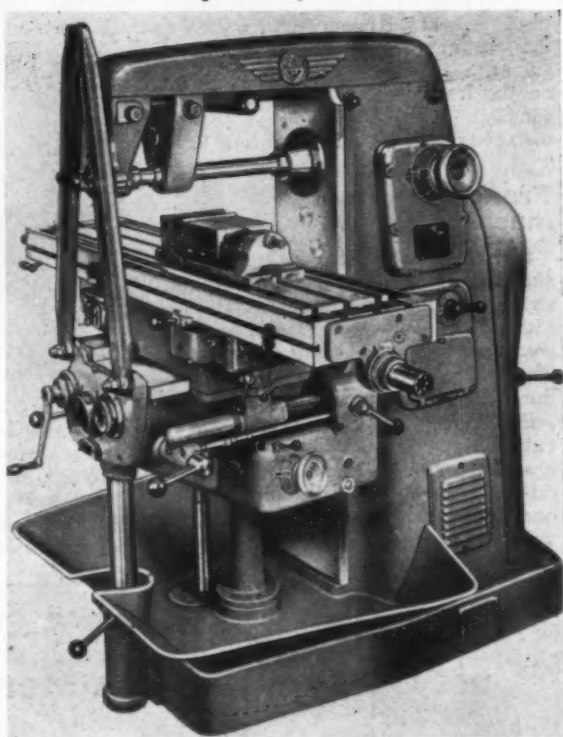
Motor and gearbox for the feeds are built on the knee so as to avoid delicate universal joints. The gear wheels are hardened and run in an oil bath, the sliding wheels run on ground spline shafts, and all bearings are automatically lubricated by an oil circulation pump.

As a safeguard against breakage of the feed mechanism the gearbox is provided with a special friction clutch which comes into operation in the case of sudden overloads or table collisions. There are 12 different feeds and quick traverse in all three directions. Aaron Machinery Co., Inc., Dept. DR, 45 Crosby St., New York 12, N.Y.

Use ACTION Card, opposite page 64. Circle No. 146

### Small-diameter pipe cutter

The H & M Model O portable flame cutting and pipe beveling machine for small-diameter pipe ( $1\frac{1}{2}$ " to 4") employs the same split-gear horseshoe



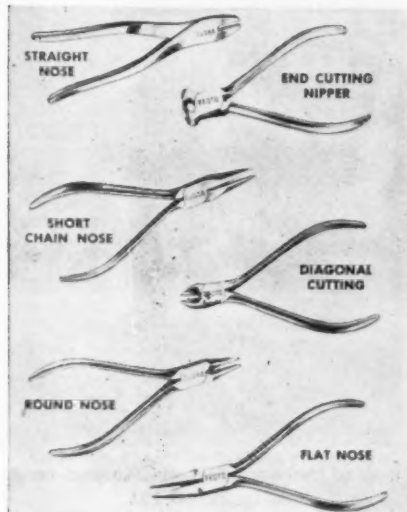
principle which characterizes the company's larger units (for pipe up to 36"). Operator may place the machine on continuous pieces of pipe. A quick-operating, specially designed boomer strap speeds up the process of changing the machine from one piece of pipe to another.

Changing the unit from one size of pipe to another is a matter merely of replacing adapters, properly identified for the various pipe sizes. The change from the smallest to the largest pipe size can be made in seconds. Any plain-barrel machine cutting torch may be used with the unit. H & M Pipe Beveling Machine Co., Tulsa, Okla.

Use ACTION Card, opposite page 64. Circle No. 147

## Midget pliers

These six Proto matched midget pliers, are forged from special steels. Cutting edges are induction-hardened. Jaws are narrow for reaching into restricted



places. All are available with red plastic Handeze grips that reduce hand fatigue, improve the grip, and make the tools easy to find. Lengths range from 4" to 4¾". Plomb Tool Co., Dept. KE, Los Angeles, Calif.

Use ACTION Card, opposite page 64. Circle No. 148

## Pneumatic impact machine

The largest in the VS (variable stroke) series of impact machines is a single acting air hammer which strikes once each time the main valve is opened. Impact is transmitted through a tool-holding collet chuck which projects through the bottom of the hammer cylinder.

An air traverse cylinder, actuated by a foot valve, lowers the hammer cylinder until the tool is firmly in contact with the work. Then an overtravel in the linkage trips the main valve and

# VIMCO *Lights*

**INSTANTLY Adjustable  
SOFT, COMFORTABLE LIGHT**



No bolts or screws to loosen, then reset. Vimco-lights adjust easily . . . stay firmly in place. Comfortable light, never over-intense . . . never under-intense, prevents eye strain and rejects. Send for bulletin.



VIMCOLIGHTS are  Listed

**VIMCO MFG. CO., INC.**

Since 1919

109 Brayton St.

Buffalo, N. Y.

Circle No. 491 on Card, Opposite Page 65

323



releases the hammer. An air clamp holds the hammer cylinder against recoil or rebound during the hammer blow.

The machine operates on constant air pressure. The column serves as surge tank. Hammer stroke is regulated by a simple adjustment at the top of the cylinder, and on a given setting the stroke and the resultant impact will be uniform regardless of variation in thick-

**LONGER TOOL LIFE—CLEANER FINISH**  
When  
You Add **LUBIKOLD**  
**Anti-Friction Compound**  
(in white powder form)

Excellent for cooling hot bearings, die-sets, pillars, slides, ways, & posts. Just add Lubikold to your present lubricating oil or grease. Lubikold reduces friction drag and saves wear on moving metal parts. Won't break down in any heat.



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Added to cutting oils, soluble oil, or any coolant, Lubikold will increase production tremendously, giving you far longer tool life and cleaner finish.

Wonderful results obtained in tapping, threading, drilling, milling, stamping, forming, punching, drawing, die-casting and etc.

For Plaster Modeling-Mix Lubikold with your present plaster separator for better parting qualities and better mold surface. The separating lubricant highly recommended by the U.S. Gypsum Co.

For free sample, literature, write to us on your letterhead today. No obligation.

**LUBIKOLD CO.** 516 Bergen St.  
Brooklyn 17, New York

Circle No. 492 on Card, Opposite Page 65



ness of the work material. Impact range is from zero to 20,000 lb.

Heidrich-Nourse Co., Dept. KE, 631 East Third St., Los Angeles 13, Calif.

Use ACTION Card, opposite page 64. Circle No. 149

**Enclosed construction  
featured in straight  
side presses**

A line of single crank straight side presses features fully streamlined, enclosed construction, front and back,

## More Capacity per Dollar

MODEL J-24 Capacity 24"x24". Largest capacity per dollar of any comparable saw. Completely hydraulic. Variable speed drive. Rugged, all welded steel construction. Trussed guide posts for extra rigidity. Big 1 1/4" blade on four band wheels handles large or small jobs with ease. Complete with coolant.

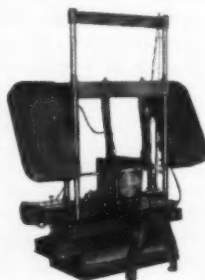
Write for FREE CATALOG!

Dept. B

**W. F. Wells and Sons**  
Metal Cutting Band Saws

THREE RIVERS  
MICHIGAN

Model J-24



Circle No. 493 on Card, Opposite Page 65



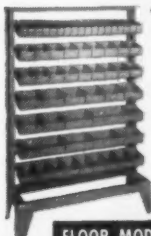
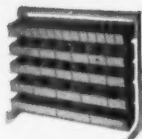
**BIN UNITS  
BENCH or FLOOR**

BY *Bathey*

**FOR STORAGE**

or

**ASSEMBLY  
OF SMALL PARTS**



**BENCH MODELS**

**FIVE SIZES  
of removable  
BIN BOXES**

*Visible parts handling  
saves time and money!*

**FLOOR MODELS**

B-6

STANDARDIZED BY AMERICA'S LEADING MANUFACTURERS

**BATHEY MFG. CO.**

100 S. MILL STREET

PLYMOUTH, MICH.

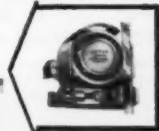
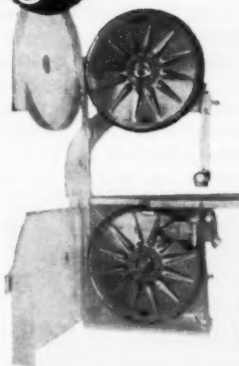
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DEALERS IN PRINCIPAL CITIES

Circle No. 494 on Card, Opposite Page 65



**-IZE** with band saw accessories  
used as standard equipment  
by leading band saw manufacturers.



- Rigid Band Saw Wheels
- Band Saw Tires
- Micro-Guides
- Guide-Line Lights

**CARTER PRODUCTS CO. INC.**

423 Wm. Alden Smith Bldg.

30 Ionia Avenue, S.W.

**GRAND RAPIDS 2, MICHIGAN**

Circle No. 495 on Card, Opposite Page 65

**PRECISION  
STARTS HERE:**

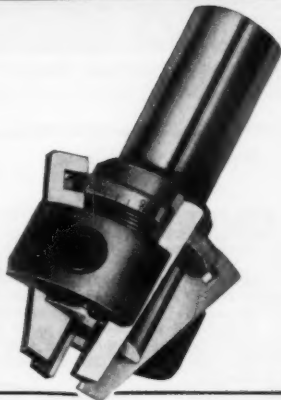
**KUTMORE  
ADJUSTABLE  
HOLLOW MILLS**

- Any COMBINATION of . . . Turning . . .  
Tapering . . . Facing . . . Chamfering . . .  
Trepanning in ONE PASS.
- Exclusive MICROMETER Adjustment Fea-  
ture For Rapid Set-Up.
- Area Sales engineers for your immediate  
Problems.

*Write for Catalogue No. 20 MT*

**CARL WIRTH & SON, INC.**

1625 CLINTON AVE. NO.  
ROCHESTER 5, N. Y.



Circle No. 496 on Card, Opposite Page 65

concealing the driving mechanism. Rigidly constructed one-piece frames of triple box section design provide maximum resistance to deflection from horizontal, diagonal and torsional stresses. Great shut height and long slide adjustment permit the use of a wide range of stamping and forming dies. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N.Y.

Use ACTION Card, opposite page 64. Circle No. 150

Over 85% of the torque wrenches used in industry are

## STURTEVANT TORQUE WRENCHES

Read by Sight, Sound or Feel

- Permanently Accurate
- Practically Indestructible
- Faster—Easier to use
- Automatic Release
- All Capacities

in inch grams  
...inch ounces  
...inch pounds  
...foot pounds

Every manufacturer, design and production man should have this valuable data. Sent upon request.

P.A. STURTEVANT CO.  
ADDISON QUALITY ILLINOIS

Circle No. 497 on Card, Opposite Page 65



### Sharpeners for engraving cutters

The Scripta AL3 sharpening machine quickly renews the life of engraving cutters and produces a complete range of original contours from uncut milling tool stock. Cutters are sharpened, without being removed from their chuck mounting. Besides speeding up the work of sharpening, this feature avoids the need to readjust the engraving machine before resuming engraving. Scripta Ma-

Now Available in . . . "SPRAY ON" CANS  
and in "BULK"

## CROWN design layout ink

Order it the way you use it — in handy 12-oz. Aerosol spray cans, or by the pint, quart, gallon or barrel in bulk! Crown ink dries to an excellent scribing texture in a minute! Ideal for pattern, "OK" or "reject" marking.

Contact your distributor,  
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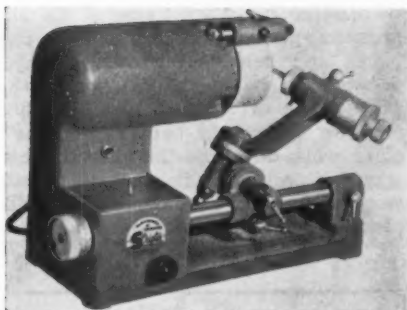


Just Press the  
Trigger on the Can

**CROWN INDUSTRIAL PRODUCTS CO.**

807 Amsterdam St., Woodstock, Ill.

Circle No. 498 on Card, Opposite Page 65



chines A Graver, 7 passage Turquetil, Paris 11, France.

Use ACTION Card, opposite page 64. Circle No. 151

### Industrial paper towels

Two new paper towels, a singlefold and a multifold, have been introduced by Scott Paper Co., Dept. RS, Chester, Pa., in order to provide the exact sizes necessary to fit most dispensers already in use.



The simplified PYRO Optical is the ideal instrument for direct temperature readings of ANY heated object in your plant. Completely SELF CONTAINED, PORTABLE, RUGGED, LIGHT-WEIGHT (3½ lbs.) and FOOLPROOF. No correction charts, no accessories and no maintenance expenses. Unique design permits temperature determination even on MINUTE SPOTS. Fast MOVING OBJECTS and of the SMALLEST STREAMS.

Write for Catalog No. 85

THE PYROMETER INSTRUMENT CO.  
New Plant and Laboratory, Bergenfield 3, N.J.

Circle No. 499 on Card, Opposite Page 65

The singlefold towel measures 10" x 10½", and the multifold is 9¾" x 9½". Each is put up in a 250 towel package, with 15 packages per case. Towels will keep their strength when wet and will stretch to fit the contours of the hands. They won't lint even when used on the toughest of beards, the manufacturer claims.

Use ACTION Card, opposite page 64. Circle No. 188

### .0003 HOLE LOCATION IN 1 MINUTE

#### EDGE FINDERS

\$2.50  
NEW

POSTPAID  
except C.O.D.

\$10.00  
DELUXE



- Thousands have proven and accepted the Deluxe Model for years.
- Jumps sideways as shown when location is reached.
- New .500 dia. Model for larger work only.



.200 Dia.

#### ADJUSTABLE VISE STOP



\$2.95

Hundreds Of Pieces To A .0003 Tolerance With This Hardened Vise Stop That Is Adjustable In All Directions. Attach To Vise With One ¼-20 Taped Hole.

Dealer Inquiries Invited

**GLOVER MFG. CO.**  
422 Park Ave. Meadville, Penna.

Circle No. 500 on Card, Opposite Page 65

### SPACE SAVERS



### RACKS FOR ALL BAR STOCKS

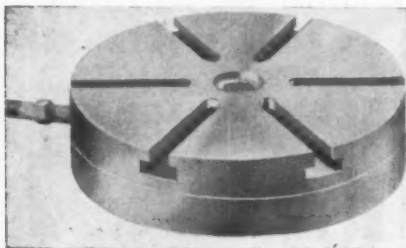
Keep your bar stock within easy reach and conserve 75% of your storage space. Eliminate handling accidents. YOHE racks placed back to back increase storage efficiency. Stock always visible. Write for literature and prices today. . . .

**THE YOHE SUPPLY CO.**  
P.O. Box 708 Canton 1, Ohio

Circle No. 501 on Card, Opposite Page 65

## Airlift tables float heavy loads

A new labor saving device now makes it possible for a female worker to move by hand work pieces weighing several tons through many stations without straining a muscle or requiring male assistance. The new device is known as the Jato airlift table. The principle of this new table is simple. Whenever a heavy work piece and fixture must be moved or indexed it is simply floated on air.



The Jato tables consist essentially of either one or two plates. In the case of double rotary plates the lower one is prepared by our method to provide air passages within it. Carefully calculated orifices permit a metered amount of air to be interposed between the two plates. This air film isolates one plate from the other and permits it to float the upper plate with its load. A child can rotate the load with one finger since, there being no contact between the plates,

there is no friction. Release of the air pressure permits full contact of the plates and hence allows full cutting pressure to be applied to the work. In the case of a single plate, the air pressure is directed between the machine work table and the plate. In this way it is possible to float a fixture and work piece from one spindle of a drill press to another or from any work

## UNIVERSAL DIVIDING HEADS



Precision built to meet every requirement, Carroll Dividing Heads are the accepted standard in metal-working plants from coast to coast. A unique optional swivel base makes possible speedy and accurate work settings to compound angles. This and other features convert a conventional Dividing Head into a Universal Work Head or Rotary Table.

Write for 8 page catalog giving complete details, etc.

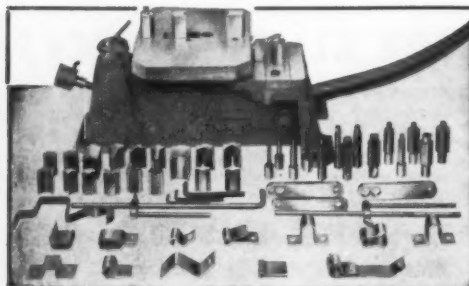


10" - 12" Universal Right or Left Hand Dividing Heads with or without Direct Indexing.

## CARROLL DIVIDING HEAD CO.

3525 Cardiff Ave. • Cincinnati 9, Ohio

Circle No. 502 on Card, Opposite Page 65



## Multiform BENDER CUTTER

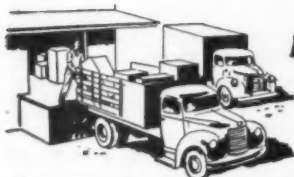
### CUTS, BENDS, PUNCHES

Available in hand or air operated models, the MULTIFORM is shipped complete with full assortment of dies and mandrels to punch, bend, and cut round or flat brass, bronze, aluminum, steel, etc., up to  $\frac{1}{4}$ " x  $1\frac{1}{2}$ " as illustrated, other models up to  $\frac{1}{4}$ " x 4".

**J. A. RICHARDS CO.**  
KALAMAZOO, MICH.

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WE SPECIALIZE IN HIGH SPEED CUTTING TOOLS



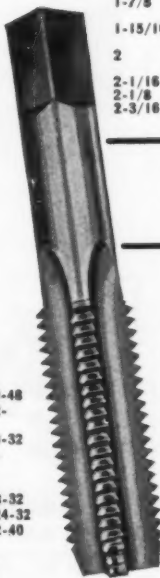
**IN STOCK FOR  
IMMEDIATE  
SHIPMENT**

All Tools Sold On A  
Money Back Guarantee

**Special  
Taps**

## HIGH SPEED RIGHT HAND TAPS

SIZE	THREAD
4	32-48-60-64
5	30-32-36-48-80
6	36-40-48-56-80
7	32-40-48
8	24-30-36-38-40-44-48
9	24-28-32-40-48
10	28-30-36-40-48-64
12	20-28-32-36-48
14	20-24-28
1/16	60-64
5/64	36-48-72
3/32	48-56-60
7/64	48-56-60
1/8	32-40
5/32	32-36-40-48
9/64	36-40-48
11/64	36
3/16	20-24-32
13/64	32-36-48
7/32	24-28-32
1/4	18-24-26-27-30-32-36-40-48
5/16	16-20-22-27-28-32-36-40
3/8	12-16-18-20-27-28-32-36-40-48
7/16	12-16-18-22-24-27-28-30-32-36-40
1/2	12-14-16-18-22-24-26-27-28-30-32-36-40
9/16	16-20-24-27-28-30-32-40-48
5/8	12-14-16-20-24-27-28-32-36-40
11/16	11-16-18-20-24-27-28-30-32
3/4	9-11-12-14-16-20-24-26-27-28-32
13/16	10-14-16-20-27-32
7/8	10-12-16-18-20-24-27-28-32
15/16	8-9-10-12-14-16-18-20-24-32
1	10-12-16-18-20-24-27-32-40
1-1/16	12-14-16-18-20-24
1-1/8	8-10-14-16-18-20-24-32
1-3/16	8-10-12-14-16-18-20-24
1-1/4	8-10-14-16-18-20-24-32
1-5/16	12-14-16-18-20-24-32
1-3/8	8-10-14-16-18-20-24
1-7/16	8-10-12-16-18-24
1-1/2	8-10-14-16-18-20-24-28
1-9/16	18-20-24-36
1-5/8	8-10-12-13-16-18-20-24
1-11/16	10-12-14-16-18-20-24



SIZE	THREAD
1-3/4	8-10-12-14-16-18-20-24
1-13/16	8-10-12-14-16-18-20
1-7/8	8-10-12-14-16-18-20-24
1-15/16	8-10-12-14-16-18-20-24-28
2	4-1/2-8-10-12-16-18-20
2-1/16	12-14
2-1/8	12-16-20
2-3/16	12-16

SIZE	THREAD
2-1/4	4-1/2-8-12-14-16-18
2-5/16	12-18
2-3/8	12-16-18
2-1/2	8-10-12
2-9/16	18
2-5/8	12-16-20
2-3/4	18
2-7/8	8-12-16
3	8-16
3-1/4	8-12-16
3-1/2	8-12-16
3-7/8	6
4	8-12

## HIGH SPEED LEFT HAND TAPS

SIZE	THREAD
0	80
1	56-64-72
2	56-64
3	56
4	32-36-40-48
5	40-44
6	32-36-40
8	32-36-40
10	24-30-32-40
12	24-28-32
1/4	20-28-32
5/16	18-20-24
	28-32
3/8	16-24-32
7/16	14-20-28
1/2	12-13-20-28
9/16	12-18-20-24
5/8	11-12-18-20-24

SIZE	THREAD
11/16	11-16-24
3/4	10-16-18-20
13/16	16
7/8	9-12-14-18-20
1	8-12-14-16-18-20
1-1/8	7-12
1-1/4	7-12-16-18
1-3/8	6-8-10-12-16-18-20-24
1-7/8	8-10-12-14-16-18-20
1-1/2	6-8-10-12-16-18-20
1-9/16	8-10-12-16-18-20
1-5/8	8-10-12-14-16-18-20
1-11/16	8-10-12-14-16-18-20
1-3/4	8-10-12-14-16-18-20
1-13/16	8-10-12-14-16-18-20
1-7/8	8-10-12-14-16-18-20
1-15/16	8-10-12-14-16-18-20
2	4-1/2-10-12

### LEFT HAND AND SPECIAL DIES IN STOCK

PRICES ON APPLICATION. NEW SIZES  
ADDED FREQUENTLY

**NOTE:** Oversize — Undersize — and ACME Taps available.  
H. S. Extension drills—Special Reamers and Special  
Milling Cutters, etc.

WRITE FOR SIZES AND PRICES

We will allow you full credit on your surplus and  
obsolete tools. Write for particulars

**SPECIAL PRICES ON  
REGULAR TOOLS.  
Send for Catalog.**

**WESTERN TOOL SUPPLY COMPANY**

617-19 W. Randolph St., Chicago 6, Ill. PHONE: Randolph 6-4113

Circle No. 504 on Card, Opposite Page 65

station to the next. All that is required is that both Jato plate and machine table be normally flat and smooth. Any table sufficiently smooth for drilling operations is satisfactory for Jato operation.

All models will lift and sustain in excess of 20 pounds to the square inch of working surface and require only normal shop airline pressure for their

operation. They consume very little air, are almost completely silent and work perfectly satisfactorily on machine tables having toe slots or holes. James C. Hartley Associates, Dept. MG, Branford, Conn.

Use ACTION Card, opposite page 64. Circle No. 186

## Wire twisting tool

The Ziptwist wire twisting tool has a simple jaw closing device that provides easy, one handed operating con-



### VERTICAL

At last, a top quality industrial sander that provides all the most wanted features - yet sells for so little. **\$89.95**

complete with cord, plug, switch ready to use

Illustrated Literature on Request

A few desirable distributor territories still available.

**WALLS SALES CORPORATION**  
333 Nassau Avenue Brooklyn 22, N. Y.

Circle No. 505 on Card, Opposite Page 65

## HAND KNOBS

### 6 Sizes Cast-Iron

Tapped, Reamed or Blank

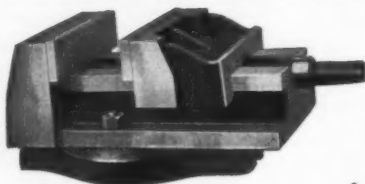
Hex-shaped hub for extra tightening

Write for catalog

**TIETZMANN TOOL CORPORATION**  
DEPT. H-K ENGLEWOOD, OHIO

Circle No. 506 on Card, Opposite Page 65

## PLUNKET IMPROVED VISES



We make a complete line of modern vises for drill presses, shapers, milling machines and grinders. Illustration shows our standard milling machine vise as regularly furnished and stocked.

In ordering this vise give size of slot in table:

No. 10-6" jaws, 1 1/2" deep, opens 5"

wt. 45 lbs. \$ 99.50

No. 20-10" jaws, 2 1/4" deep, opens 8 1/2"

wt. 120 lbs. \$135.00

Best material and workmanship. Prices are net f. o. b. Chicago Dealers' inquiries are solicited.

Write for folder TODAY

**J. E. Plunket Machine Co.** 3230-32 Archer Ave.  
Chicago 8, Ill.

Circle No. 507 on Card, Opposite Page 65



venience. Its short speedy strokes give good control, eliminate damage to finished surfaces. Its jaws are smooth-faced and will not mark iron, plated, stainless or monel wire, yet grip securely.

Guide pins in the jaws provide for proper wire positioning and assure symmetrical twists, either right- or left-handed. Avionics Tool Co., Dept. KE, 14117 Oxnard St., Van Nuys, Calif.

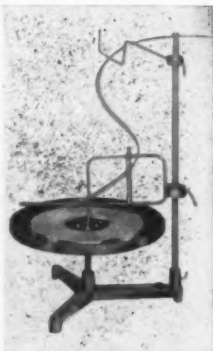
Use ACTION Card, opposite page 64. Circle No. 155

## economically priced press room equipment

### DURANT Automatic Stock Reels

Operates by natural spring of uncoiling stock. Priced from \$85.00. Nine other models of stock reels in vertical, horizontal, motorize or automatic types for all applications.

Manufacturers of Stock Reels, Roll Feeds, Straighteners, Scrap Choppers, Die Pullers, Foot Presses, Coil Cradles, Press Guards, Stock Oilers.



WRITE FOR NEW FREE CATALOG  
**DURANT TOOL SUPPLY Co.**  
PROVIDENCE 3, RHODE ISLAND

Circle No. 508 on Card, Opposite Page 65

## Small diameter inside micrometers

P and PX inside micrometers are furnished with a wide variety of ranges: .310" through 1.250".

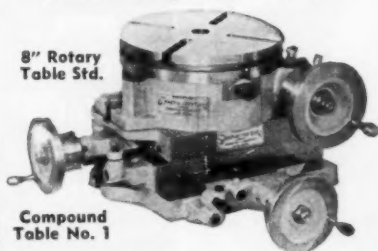
Micrometers have gaging tips which are rectangular in cross-section, permitting the construction of a rugged mechanism for checking very thin grooves and recesses. The rectangular design also provides immediate central-

## The **STEVENS** Line

SINCE 1925

### Introducing NEW series

8" Rotary  
Table Std.



Compound  
Table No. 1

ROTARY TABLES, 5-7½-9-12-15-18-24" sizes  
both standard & dial indexing types  
ADJUSTABLE TILTING TABLES, #0-2  
COMPOUND TABLES, #1-2  
ROTARY-COMPOUND TABLES, #1-1½-2  
INDEX CENTERS - multiple spindle  
ROTARY-COMPOUND TABLES, #1-1½-2

See your dealer or write for bulletins

The **JOHN B. STEVENS Company**  
SOMERSVILLE, CONN.

Circle No. 509 on Card, Opposite Page 65

## A Simple Formula for Solving Tooling Problems

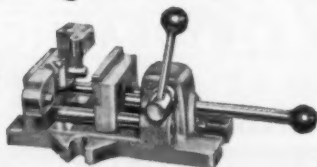
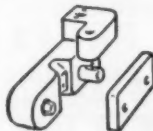
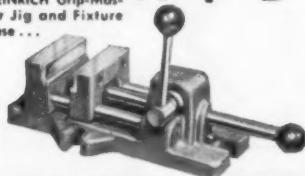
No need to start from scratch... use the HEINRICH Grip-Master Jig and Fixture base...

**A + B**

Simply add false jaws and bushing plate.

**= C**

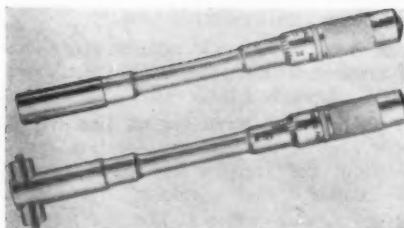
Result... an accurate, low-cost Drill Jig.



**HEINRICH TOOLS, Inc. Dept. 106-L Racine, Wis.**

Circle No. 510 on Card, Opposite page 65





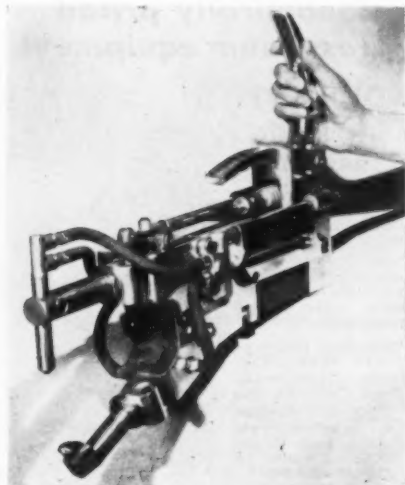
ization to a positive line-contact stop.

Tip widths are 1/16", 3/32", and 1/8", .015", .025", and .035". Rimat Gage Co., Dept. KE, 21 West Dayton St., Pasadena, Calif.

Use ACTION Card, opposite page 64. Circle No. 156

### Spot welder

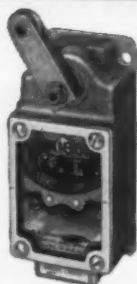
Model 192 spot welder incorporates a convenient lever that lowers and raises the bottom arm. Line includes air cooled and water cooled models and air hydraulic and air operated guns. Aro Spot



Welders Div., Guthery Machine Tool Corp., Dept. DR, 38-31 Crescent St., Long Island City 1, N.Y.

Use ACTION Card, opposite page 64. Circle No. 157

## WATERTIGHT!



OVER  
5,100,000  
CONTACTS  
UNDER  
WATER!

(Switch Reversing  
Actuating Motor)

**LOXSWITCH** Heavy  
Duty  
**LIMIT SWITCHES**

**FREE** 4 page folder describing 7 models,  
19 contact arrangements.

**R. B. DENISON MFG. CO.**

102 St. Clair Ave. N.W. • Cleveland 13, Ohio

Circle No. 511 on Card, Opposite Page 65

*Greenerd* ---  
**HYDRAULIC PRESSES**

for - -

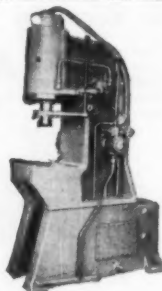
ASSEMBLING • FORMING  
BROACHING • MOLDING  
STRAIGHTENING. 1½ to 75 Tons

**GREENERD ARBOR PRESS CO.**

141 CROWN ST. • NASHUA, N.H.

Send Today for  
Complete Cat. #556

Circle No. 512 on Card, Opposite Page 65



## Tubing cutter and conveyor

The Cooney No-Scrap tubing cutter and conveyor is an automatic sawing and deburring unit with built-in conveyors. The unit will handle tubing up to 1½" in diameter and up to .050 in wall thickness.

The tubing is loaded into an automatic clamping fixture, then sawed in two. The saw can be constructed to cut the tubing at any required angle. A

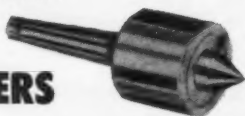
single cut delivers two identical parts from each piece of tubing fed into the unit, with no scrap or waste.

After sawing, conveyors elevate one half of the tubing and lower the other half, then advance both halves for deburring. At the end of each cycle two finished parts are delivered by conveyor to the assembly line. Cooney Industries, 17245 E. 10 Mile Rd., East Detroit, Mich.

Use ACTION Card, opposite page 64. Circle No. 158

**MANHATTAN'S MIRACLES!  
TOP VALUE — LOWEST PRICE**

### HEAVY DUTY LIVE CENTERS



- #2 Morse Taper \$15.00
- #3 Morse Taper \$18.00
- #4 Morse Taper \$25.00

**SAVE  
40%**

Hardened and ground • Sealed roller ball bearings • Accurate free-turning point  
Precision made in Western Germany

For tremendous savings, write for circular listing sensational bargains.

**MANHATTAN SUPPLY COMPANY**  
The Cutting Tool Discount House  
151-A GRAND ST., NEW YORK 13, N. Y.  
Telephone CAnal 6-4992

Circle No. 513 on Card, Opposite Page 65

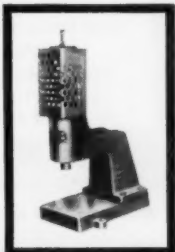
## IMPROVE PRODUCTION—LOWER COSTS THE HIGH-SPEED WAY —NEW

### SOLENOID PUNCH

Blow delivered in 1/5 sec. cycle on 110 volt single phase power. Exclusive positive alignment spindle design. Stakes, rivets, marks, cuts off, bends and crimps, etc.

### FREE ASSEMBLY ENGINEERING

SERVICE is provided by High Speed Hammer Co. Just send samples or blue prints of parts to be assembled. We'll recommend the right tools, procedure and equipment to use . . . without cost or obligation.



### HIGH SPEED HAMMER CO., INC.

311 Norton St., Rochester 21, N. Y.

manufacturers of High Speed Riveting Hammers, Staking Machines, Solenoid Punches, Noiseless Rivet Spinners, Hand Presses, Wire Strippers and Sensitive Drilling Machines.

**NOTE:** We have the most complete line of riveting machinery and can recommend the correct type machine, tooled and ready to go into operation upon delivery.

Circle No. 514 on Card, Opposite Page 65

## INSTANT ACTION RAPIDSET

by HARTMANN

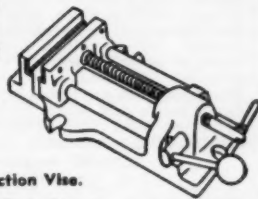
All Purpose Tool Room and  
Machine Shop Vises.

### The JAWSET

Adjustable Pressure Production Vise.

For Information Write Dept. M

**Hartmann Mfg. Co., 1637 Gould St., Racine, Wisconsin**



Circle No. 515 on Card, Opposite Page 65

# SLOCOMB micrometers

## Greater Accuracy plus Longer Wear



Always known for excellent performance, the new Slocomb Micrometer made by Connecticut machine tool craftsmen is better than ever with 14 exclusive features that mean greater accuracy and longer wear.

Over 700 different models.

QUICK REPAIR SERVICE

**J. T. SLOCOMB CO.**  
Glastonbury, Connecticut

Circle No. 516 on Card, Opposite Page 43

**Here's the dope!**

**TAMMS**  
**BLUE LAYOUT DOPE**  
**TAMMS INDUSTRIES, INC.**  
228 N. La Salle St., Chicago 1, Ill.

**WRITE for SAMPLE**

**DRYS FAST-RESISTS OIL**  
**WON'T CHIP, CRACK OR FLAKE OFF!**

Circle No. 517 on Card, Opposite Page 63

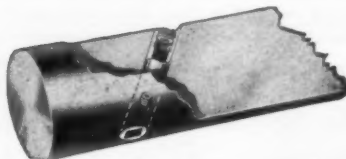
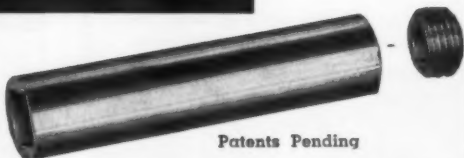
## How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

**SLEEVES MADE IN FOLLOWING SIZES:**  
3-16, 1-4, 5-16, 3-8, 7-16, 1-2, 5-8, 3-4, 1"

**STURDY BROACHING SERVICE, INC.**  
23516 TELEGRAPH ROAD • DETROIT 19, MICH.



*Write for  
Literature*

Circle No. 518 on Card, Opposite Page 63

## SET UP COMPOUND ANGLES INSTANTLY!

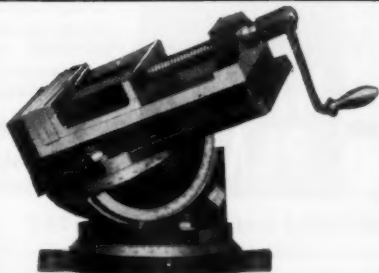
Now save valuable time on intricate, angular set-ups with the fully universal MASTER MULTI-SWIVEL VISE. Three swivels instantly set any compound angle. Used worldwide. Interchangeable platens optional.

Write for circular.

**DONOVAN MFG. CO.**

80 Batterymarch St.

Boston 10, Mass.



Circle No. 519 on Card, Opposite Page 65

## Platen-Type Belt Grinder

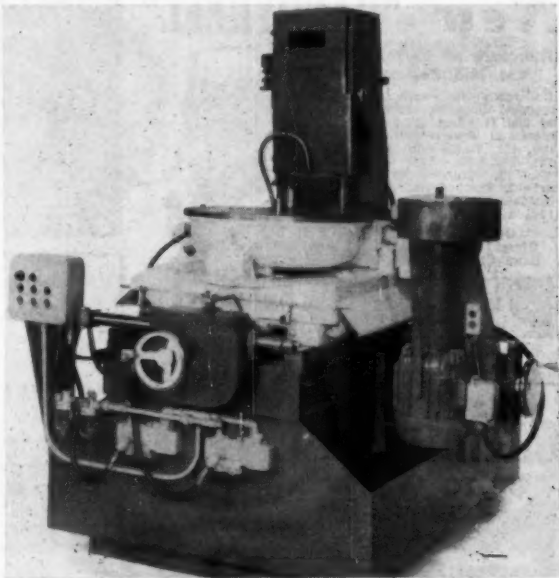
For high-speed grinding and finishing of outside diameters, an automatic rotary abrasive belt grinder handles circular parts from 26" to 40" dia. and can be modified to meet other diameter ranges.

Work table rotates at standard speeds of either  $\frac{1}{4}$  or 3 revolutions per minute, with optional change gears for other rpm requirements. An air-controlled infeed mechanism carries the rotating parts in against the belt, and infeed travel is adjustable with a minimum of .0016-inch per revolution.

To insure even distribution of belt wear, the parts are moved back and forth across the belt face by means of an air-hydraulic reciprocating device, with 7-inch oscillation stroke. The table is adjustable from 0 to 45 degrees for angular grinding.

Standard abrasive belt size 8" x 107", with belt speed available from 2000 to 5000 sfpm. Capacity of coolant unit, equipped with  $\frac{1}{2}$  hp coolant pump, is 100 gallons. Engelberg Huller Co., 831 W. Fayette St., Syracuse 4, N.Y.

Use ACTION Card, opposite page 64, Circle No. 161



## CAM MILLING

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

*Your Inquiries Answered Promptly*

HIMOFF MACHINE CO., INC.

13-22 44th Road Long Island City 1, N. Y.

Circle No. 520 on Card, Opposite Page 65

# The MARKET PLACE

Advertisements acceptable in THE MARKET PLACE include those for employment, sales services, production facilities, representation and related needs. Rates: \$20 per column inch per insertion. Maximum size advertisement accepted in this section is three inches.

Copy should reach us by the first of the month for next month's issue.

MACHINE and TOOL BLUE BOOK

A Hitchcock Publication

Wheaton, Ill.

## End Extension Cord Problems! New "HANDYREEL"

Hundreds of Uses in  
Plant, Mill, Factory

Be ready for work in seconds. Supplies current to 300 ft. Reel stays at source of power—no lifting, etc. Holds 300' No. 16; 200' No. 14; 130' No. 12. Sturdy, lightweight. Steel drum. Adjustable brake. 12" wide, 12 1/4" high. Sold less cord.

Order By Mail  
Direct From Factory  
Send Check or M.O.



Pull Out  
Any Length

ONLY **7<sup>95</sup>** POSTPAID

**LAKESHORE  
PRODUCTS**  
WOODINVILLE, WASH.

## ACETATE SHEETS

UP TO 1/4" THICK

Sheet sizes

20" x 50"

INDUSTRIAL PRODUCTS SUPPLIES

201 S. Dean St., Englewood, N. J.

Ideal for Machine Guards  
Windows  
Safety Shields  
Blue Print  
Covers

## MACHINE SHOP FOR SALE

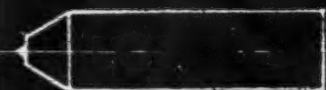
Hoffman's Machine Shop doing arc and acetylene welding, cylinder grinding and general machine work. Equipped with 35 power machines including 7 lathes. For complete information write.

**GEORGE H. HOFFMAN**

615 West A St. San Diego, California

## DIAMOND DRESSERS for THREAD GRINDERS

Guaranteed Tolerances \$2.50



Complete line of  
Diamond Wheels and Tools

**ALLSTATE DIAMOND PRODUCTS**

80-82 Bowery CA 6-2560 N. Y. 13, N. Y.

## FILES AND VACUUM PUMPS

WRITE US.

**WILLIAM REID CO.**

2271 Clybourn,

Chicago 14, Ill.

"Key to Preventive Maintenance"  
**MACHINE TOOL RECONDITIONING**  
& the Art of Hand Scraping (New 2nd  
printing)—useful for design, shop &  
inspection work—

Write for folder describing illustrated book  
**MACHINE TOOL PUBLICATIONS**  
215 Commerce Bldg., East 4th St.  
St. Paul 1, Minn.

## Make your own Storage & Pallet Racks

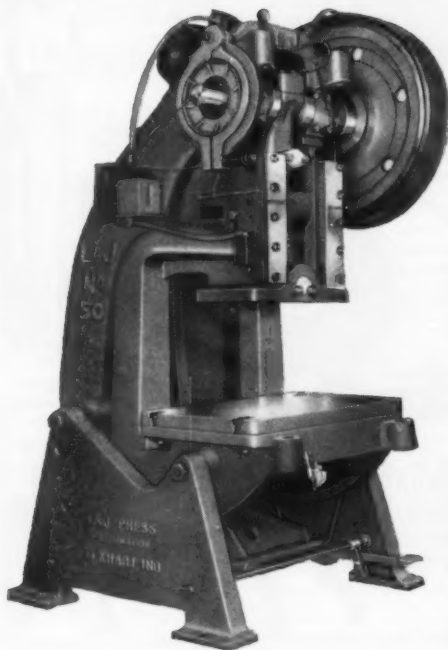


with Amidon Fittings  
and one inch pipe.

**Amidon Engineering Co.**  
ELYRIA 10, OHIO

# L&J 50

## SERIES



**Write for Bulletin L-14**  
14 to 90 ton O.B.I. Presses, 20  
to 50 ton Straight Side Presses.

### EXTRA CAPACITY WITH PRECISION TO MATCH

Large area dies are no problem when you have an L&J No. 50 Series press with its extra capacity. The exceptionally heavy frame provides maximum rigidity which enables the flanged, box-type ram to maintain precision alignment for precision jobs. The large work area will permit you to run a greater variety of work. Its dependability and tooling ease provide a new high in press efficiency.

Available in geared and non-geared models. Air clutch is available. It will pay you to get complete details now.

#### SPECIFICATIONS

**Capacity:** Model 50—50 tons, Model 50B—56 tons. **Shut Height:** 10" to 25". **Ram Stroke:** 3" to 8". **Ram Adjustment:** 3". **Ram Face:** 24" x 12". **Bolster Plate:** 36" x 24" x 2 1/4". **Throat Depth:** 12 1/2". **Opening Thru Back:** 22". **Speed:** Model 50 Non-geared—100 S.P.M., Geared—50 S.P.M. Model 50B Non-geared—95 S.P.M. Geared—46 S.P.M. *Higher speeds with air clutch.*

## L&J PRESS CORPORATION

1625 STERLING AVENUE, ELKHART, INDIANA



Circle No. 528 on Card, Opposite Page 65

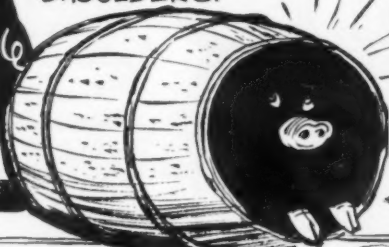


# Mechanics Through The Ages

MANY OF THE ...

## STEAMBOATS

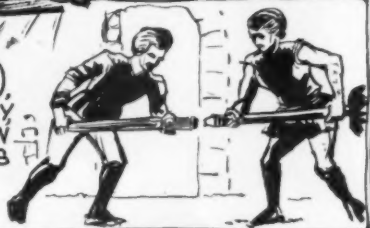
OF EARLY 19TH CENTURY AMERICA WERE LUBRICATED AND ILLUMINATED BY OIL MADE FROM CHOICE PORTIONS OF THE CARCASSES OF **HOGS!** IN THOSE DAYS, MANY SLAUGHTER HOUSES PACKED FOR EATING PURPOSES ONLY THE HAMS AND SHOULDERS.



AL REETZ

## AS EARLY AS 1500,

WORKERS OF NUREMBURG, GERMANY USED TOOLS PROVIDED WITH HOLLOW HANDLES INTO WHICH OTHER TOOLS COULD BE INSERTED.



**The Pioneer Clock**, BUILT IN 1326 BY RICHARD WALLINGFORD, ABBOTT OF ST. ALBANS, ENGLAND AND SON OF A BLACKSMITH, WAS STILL TELLING TIME DURING THE REIGN OF **HENRY VIII** ----

*200 years later!*



# for Single or Multiple PRECISION TAPPING

## on your SPECIAL MACHINES

The WISCONSIN Model TU-415 Automatic Lead Screw Tapping Unit is a completely self-contained assembly designed especially for precision work on your special machines.

It may be mounted in any position and is permanently sealed against coolant entry.

Safety Features provide positive protection against spindle over-travel and tap end-thrust.

Setting up and Re-setting is done easily and quickly. Versatility is assured by ready changeability of spindle speed, spindle travel and thread pitch.

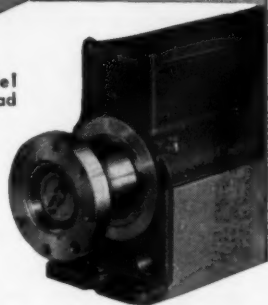
Controls are built in. A reversing motor controller and initiating switch or push button operate the unit. No relays are required.

Precision Construction permits precision tapping on a production basis. Simplicity of design assures ease of maintenance, accessibility of all parts.

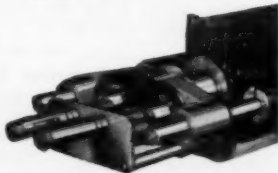
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WISCONSIN Model  
TU-415 Automatic Lead  
Screw Tapping Unit.



For Single Spindle Tapping, the TU-415 is furnished without quill flange and with ASA 1" bore, adjustable adapter spindle.



For Multiple Spindle Tapping, standard equipment includes flanged quill and slotted spindles for close-coupled multiple spindle tapping heads.



**WISCONSIN DRILL HEAD CO.**

4981 N. 124th STREET • BUTLER, WISCONSIN  
Circle No. 529 on Card, Opposite Page 65

## DON'T OVERLOOK THESE FEATURES

MACHINE AND TOOL

**blue book**

**A round-up of Washington news.** Highlighted are the following features: The status of the Hoover proposals; how organized labor is girding for more benefits to Federal employees preliminary to their pitch to industry for the same benefits; the October-December period outlook for business; the increase in apprentice employment .....

**A training program can pay off!** An interview with W. E. Bahl, vice president in charge of manufacturing, National Cash Register Co., reveals that NCR has a training program going on all the time. An offshoot of this program is their system for work simplification which has brought excellent results in cutting costs and promoting efficiency.

**Setting 90 degree bends in sheet metal.** Five basic methods are outlined by Allan Young, tool design engineer of Collins Radio Co. The problem of producing an accurate angle between the two surfaces of steel for the full length of the bend is stressed by the author .....

**Discharge machining.** It can save you money if you sharpen a large enough quantity every day. By substituting brass for diamond wheels you can cut regrinding costs 65% .....

**The News of Automation Section.** Featured are the highlights of the International Harvester Company's Technical Conference held at the I. H. laboratories in Chicago. A summary of the machine tools displayed and demonstrated is presented along with the high points of talks made by I. H. and other technical personnel .....

**To solve the problem of finishing O.D. surfaces of 14" diameter cast steel rings** an indicating fixture was used. Chuck jaws are adjusted to fit snugly against the I.D. of the work until each dial indicator registers "zero." By H. J. Gerber .....

**Cold heading versus screw machine production.** A case history of one company's experience with both of these methods of producing worm screws, assembly eyelets and terminal rivets points out the case for screw machine production .....

### PAGE

83

99

105

110

117

125

170

## MULTI-PURPOSE WONDER GRIP VISES

4 STEPPED JAWS PERMIT CLAMPING of rough castings, irregularly shaped, round, and tapered pieces accurately and quickly, eliminating need for special jigs or fixtures. Narrow stepped jaws allow free access to and measuring of work pieces and provide clearance for cutting tools. Small work pieces machined on three sides without reclamping. Easy and quick to mount and align on any machine. Holds rigid in any position without vibration. Various capacities and extra soft jaws available.

Horizontal  
Swivel  
Type



Horizontal & Vertical  
Swivel Type

## TAPPING ATTACHMENTS

Reversible safety tapping attachments with adjustable graduated friction drive, hardened, ground and lapped, complete with torque bar and handles. Precision made throughout by long established reputable West German factory.



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Also United States Distributors  
of European Machine Tools

*Tested for Performance to High Amer. Standards  
Immediate Delivery from N. Y. Stock*

**MADE IN GERMANY**

**Low Competitive Prices**

- Quick Change Chucks and Collets
- Wille-Grip Keyless Drill Chucks
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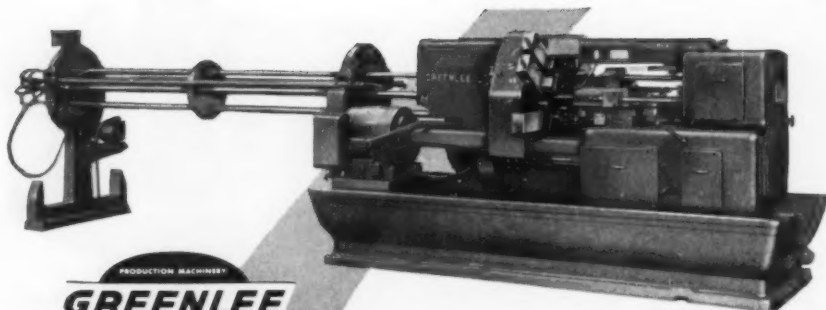
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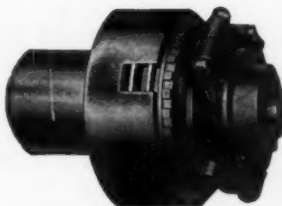
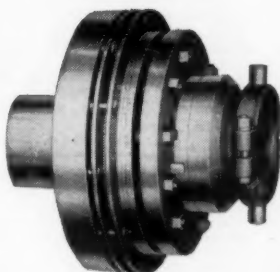
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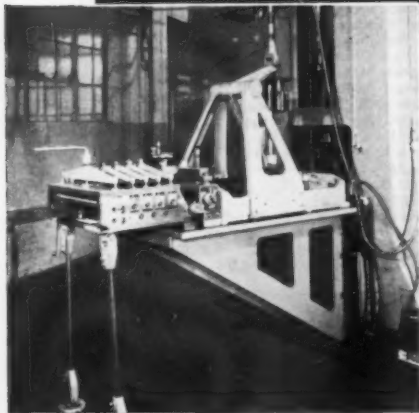
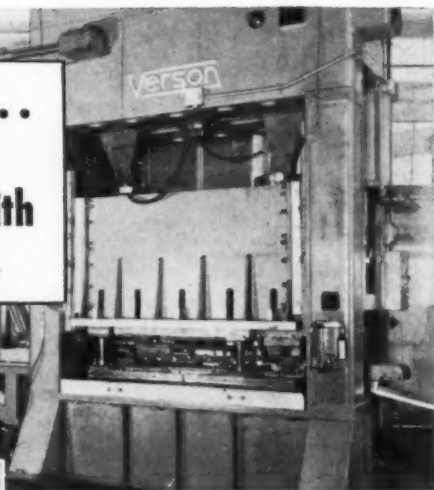
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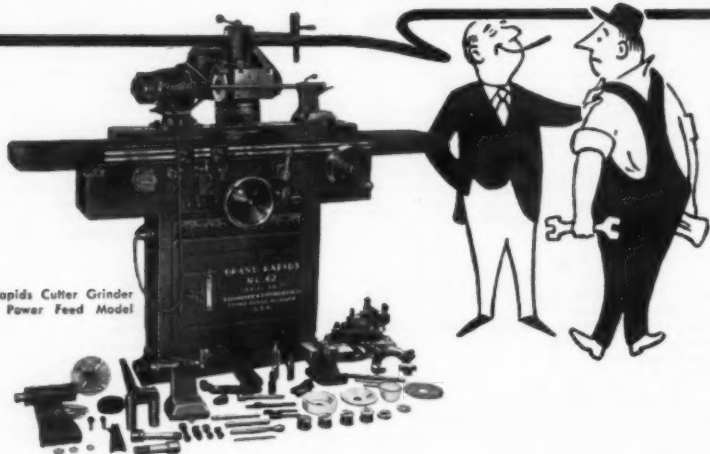
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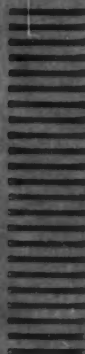
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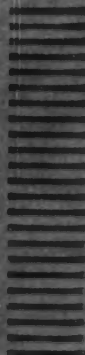
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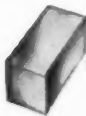
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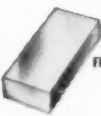
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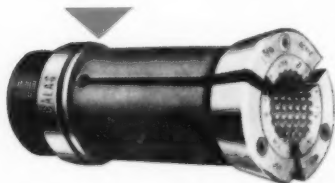


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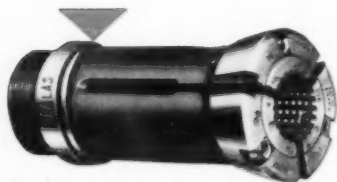
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